PATENTS FOR INVENTIONS

ABRIDGMENTS

OF

Specifications

RELATING TO

ELECTRICITY AND MAGNETISM,

THEIR

GENERATION AND APPLICATIONS.

PART II.—A.D. 1858-1866.

(ISSUED BY ORDER OF THE COMMISSIONERS OF PATENTS.)

LONDON:
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1870.

PREFACE.

THE Indexes to Patents are now so numerous and costly as to render their purchase inconvenient to a large number of inventors and others, to whom they have become indispensable.

To obviate this difficulty, short abstracts or abridgments of the Specifications of Patents under each head of Invention have been prepared for publication separately, and so arranged as to form at once a Chronological, Alphabetical, Subject-matter, and Reference Index to the class to which they relate. As these publications do not supersede the necessity for consulting the Specifications, the prices at which the printed copies of the latter are sold have been added.

The number of Specifications from the earliest period to the end of the year 1866 amounts to 59,222. A large proportion of the Specifications enrolled under the old law, previous to 1852, embrace several distinct inventions, and many of those filed under the new law of 1852 indicate various applications of the single invention to which the Patent is limited. Considering, therefore, the large number of inventions and applications of inventions to be separately dealt with, it cannot be doubted that several properly belonging to the group which forms the subject of this volume have been overlooked. In the progress of the whole work such omissions will, from time to time, become apparent, and be supplied in second or supplemental editions.

This volume is a continuation of the "Abridgments of "Specifications relating to Electricity and Magnetism, "their Generation and Applications," already published, and brings the Abridgments to the end of the year 1866. From that date the Abridgments have not been published in classes, but will be found in chronological order in the quarterly volumes of the "Chronological and Descriptive Index" (*see* List of Works at the end of this book). It is intended, however, to publish these Abridgments in classes as soon as the Abridgments of all the Specifications from the earliest period to the end of 1866 have appeared in a classified form. Until that takes place, the reader (by the aid of the Subject-matter Index for each year) can continue his examination of the Abridgments relating to the subject of his search in the Chronological and Descriptive Index.

The rules for including inventions in this series, and the method of making abridgments therein, are the same as those adopted in the preceding volume; and in regard to the scientific terms used, the same care has been taken to preserve uniformity and correctness.

This series contains some inventions that relate to the protection of ship's bottoms from fouling and from corrosion. In cases where electric force is *prevented* in order to ensure non-corrosion, the invention is not included; but when, by means of the corrosion, or slow and equable oxidation of a conductor of electricity—such as zinc—electric force is *called into action* and the corrosion of the ship's bottom is thereby obviated, the invention is included in the present series.

The Abridgments marked thus (* *) in the following pages were prepared for another series or class, and have been transferred therefrom to this volume.

October, 1870. B. WOODCROFT.

INDEX OF NAMES.

[The names printed in *Italic* are those of the persons by whom the inventions have been communicated to the Applicants for Letters Patent. The Roman numerals refer to the Introduction.]

INTRODUCTION.

Such has been the advance and practical development of electric science since the publication of the first volume of abridgments referring to this subject, that it would be very difficult to include every invention or discovery since the year 1857 in this summary, only the most important therefore form the subjects of the following notes, and, unless otherwise stated, the inventions or discoveries are between the years 1858 and 1866 inclusive.

Notices of the following inventions and discoveries should have appeared in the original work, but were accidentally omitted therefrom:—

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1843. Professor Charles Wheatstone, on June 15, 1843, read the Bakerian Lecture to the Royal Society. An account was therein given of certain instruments and processes for determining the constants of a voltaic circuit. A modification of a Daniell's battery furnished the current; the *rheostat* regulated the amount of current. An astatic galvanometer, a series of resistance coils, the *differential resistance measurer* ("Wheatstone's balance"), and some other instruments are described, also the methods of using them are fully set forth. (See *Phil. Trans.* for the year 1843, p. 303.)

1850. Professor C. Matteucci, in 1850, put forward, in his communications to the Royal Society, the doctrine of the correlation between the electric current and nervous force. In his paper on "induced contraction" he draws attention to electric states developed by nervous contraction. (See *Phil. Trans.* for the year 1850, p. 287 and p. 645.)

1850. Dr. W. B. Carpenter, on June 20, 1850, read a paper to the Royal Society on the mutual relations of the vital and physical forces. In this paper the analogy of nervous force to electric force is insisted on. (See *Phil. Trans.* for the year 1850, p. 727.)

A.D.

1861. Professor C. MATTEUCCI, on July 20, 1861, read a paper to the Royal Society on certain electro-physiological researches in which he proves "that whenever a nerve is traversed by an electric current, it acquires in all its points a secondary electro-motor power." (See *Phil. Trans.* for the year 1861, p. 363.)

1861. Professor W. THOMSON and Mr. F. JENKIN, in September 1861, published an explanation of the true and false discharge of a coiled electric cable. Professor Thomson explained that the second current, or "false discharge" was attributable to mutual electro-magnetic induction between different parts of the coil, and Mr. Jenkin verified this statement by experiments. (See *Phil. Mag.*, fourth series, Vol. XXII., p. 202.)

1861. Mr. BALFOUR STEWART, on November 21, 1861, read a paper to the Royal Society, "On the great magnetic dis-"turbance which extended from August 28 to September "7, 1859." He thence draws results that sun spots, auroral displays, and magnetic storms are intimately connected. (See *Phil. Trans.* for the year 1861, p. 423.)

1861. Dr. LAMONT, in 1861, published the results of his experiments on the most advantageous form of magnets. He prefers a magnet, mounted as a compass needle, to be "flat, contracting to a point from the middle." Great magnetic strength, with trifling weight, can be obtained "by firmly connecting several thin and flat magnets "near or upon one another in one system without their "touching each other." (See Poggendorff's *Annalen*, Vol. CXIII., p. 239; also *Phil. Mag.*, fourth series, Vol. XXII., p. 369.)

1862. Dr. A. MATTHIESSEN and M. VON BOSE, on January 16, 1862, read a paper to the Royal Society, "On the influence "of temperature on the electric conducting power of "metals." Formulæ for certain metals are given. Copper and silver, after being heated to 100° C. for several days, increase in conducting power. Bismuth increases notably, by heat (as above), in conducting power. Tellurium after being heated, as above, decreases in conducting power. (See *Phil. Trans.* for the year 1862, p. 1.)

1862. Mr. C. V. WALKER, on February 13, 1862, read a paper to the Royal Society, "On magnetic calms and earth "currents." He comes to the conclusion "that currents

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"of electricity are at all times moving in definite directions "in the earth," and that north-east and south-west, currents prevail. (See *Phil. Trans.* for the year 1862, p. 203.)

1862. Professor G. G. STOKES, on June 19, 1862, read a paper to the Royal Society, "On the long spectrum of electric "light." The "invisible" rays are considered in reference to their absorption by alkaloids, glucosides, &c. (See *Phil. Trans.* for the year 1862, p. 599.)

1862. The Rev. T. R. ROBINSON, on June 19, 1862, in his paper read to the Royal Society, comes to the conclusion that the spectrum of the electric light given by a compound body, is not the superposed spectra of its elements. (See *Phil. Trans.* for the year 1862, p. 939.)

1862. Mr. FLEEMING JENKIN, on June 19, 1862, in a paper read to the Royal Society on the laws of transmission of electric signals through submarine cables, arrives at the following conclusions:—1. The electro-motive force of the battery has no effect on the velocity with which the current is transmitted. 2. In all submarine cables there is a limit to the number of signals which can be sent per minute. 3. The rate of transmission varies inversely as the square of the cable's length. (See *Phil. Trans.* for the year 1862, p. 987).

1863. Mr. G. B. AIRY, on April 23, 1863, read a paper to the Royal Society, "On the diurnal inequalities of terres- "trial magnetism, as deduced from observations made at "the Royal Observatory, Greenwich, from 1841 to 1857." "The magnetic action of the sun on the earth's southern "hemisphere has remained nearly unaltered, while that "on the northern hemisphere has undergone a great "diminution;" this is in reference to the horizontal force. The vertical force has also been subject to remarkable changes. (See *Phil. Trans.* for the year 1863, p. 309.)

1863. Mr. CHARLES CHAMBERS, on May 21, 1863, read a paper to the Royal Society "On the nature of the sun's "magnetic action upon the earth." He arrives at the conclusion that no effect of the sun's action as a magnet is sensible at the earth, but that the sun affects the earth magnetically by indirect means. (See *Phil. Trans.* for the year 1863, p. 503.)

1863. Major-General EDWARD SABINE, on June 18, 1863, read a paper to the Royal Society on the "Results of the mag-

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"netic observations at the Kew Observatory, from 1857 "and 1858 to 1862 inclusive." The phenomena noticed are, "an increase of the dip and of the total force, and a "deflection of the north end of the declination magnet "towards the west, in both hemispheres, in the months "from October to March, as compared with those from "April to September." Many other points are set forth. (See *Phil. Trans.* for the year 1863, p. 273.)

1863. Mr. JOHN MICKLE, in December 1863, published an account of certain experiments on thermo-electrical currents from the condensation of vapour and the evaporation of water. The battery used was 40 pairs of iron-copper; a single pair, however, may be used. The currents were very definite, heat being liberated by condensation, and cold by evaporation. A thermo-electrical hygrometer is alluded to. (See *Phil. Mag.*, fourth series, Vol. XXVI., p. 435.)

1863. Mr. G. B. AIRY, on December 17, 1863, read a paper to the Royal Society embodying the analysis of 177 magnetic storms, registered by the magnetic instruments in the Royal Observatory, Greenwich, from 1841 to 1857. The impression suggested by the numerical conclusions is that there may be in proximity to the earth a "magnetic ether," the disturbances of which produce currents and eddies therein. (See *Phil. Trans.* for the year 1863, p. 617.)

1864. Major-General EDWARD SABINE, on May 26, 1864, read a paper to the Royal Society on certain disturbances of the magnetic declination in 1858 and 1859, at Kew, and at Nertschinsk. In this paper the causes which produce synchronous disturbances at the above stations are said to be cosmical. (See *Phil. Trans.* for the year 1864, p. 227.)

1864. Professor CLERK MAXWELL, on December 8, 1864, read a paper on "A dynamical theory of the electro-magnetic "field." Certain results are obtained in a symbolic form, and are applied to the calculation of the self-induction of the coil used in the experiments of the Committee of the British Association on standards of electric resistance, and the value compared with that deduced from the experiments. (See *Phil. Trans.* for the year 1865, p. 459.)

1864. The BRITISH ASSOCIATION in 1864 published their treatises and reports upon standards of electrical resistance. The standard resolved upon is founded upon the units of time, space, and mass, and the B. A. ohm is a

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resistance equal to ten million absolute electro-magnetic units. The length and weight of a wire of gold-silver alloy which represents the B. A. unit is 0·5995 metre of a wire, one metre of which weighs a gramme. (See British Association *Reports* for 1863 and 1864.)

1865. Professor R. BUNSEN, in 1865, published the results of his experiments upon pyrolusite and copper pyrites as substitutes for bismuth in a thermo-electric arrangement. A pair of copper pyrites—copper, heated at one end above the melting point of tin, and cooled by means of water at the other end, gave an electro-motive force of $\frac{1}{10}$th of a Daniell's element. (See Poggendorff's *Annalen*, Vol. CXXIII., p. 505; also *Phil. Mag.*, fourth series, Vol. XXIX., p. 159.)

1865. Messrs. EVANS and SMITH, on March 16, 1865, read a paper to the Royal Society on the magnetic character of certain armour-plated ships, and on the effect on the compass of particular arrangements of iron in a ship. Amongst the conclusions drawn it appears that "for compasses to " be placed in the after part of the ship, the best direction " for building is head south." (See *Phil. Trans.* for the year 1865, p. 263.)

1865. M. HOLTZ, in April 1865, published his first account of an electrical induction machine. A fixed glass disc carries an even number of tinfoil sectors, which receive from a small electrical machine alternately positive and negative electricity. See *Berliner Berichte*, April 1865; also *Phil. Mag.*, fourth series, Vol. XXX., p. 159.)

1865. M. S. MARCUS, in 1865, constructed a thermo-electric battery with a positive element composed of an alloy of copper, zinc, nickel, and cobalt, and with a negative metal of antimony, zinc, and bismuth. One element has the electro-motive force of $\frac{1}{25}$th of that of a Bunsen's element. (See *Sitzungsbericht der Akademie in Wien*, No. 8, 1865; also *Phil. Mag.*, fourth series, Vol. XXIX., p. 406.)

1865. M. HOLTZ, about November 1865, succeeded in improving his electrical machine. This is the same in principle as that put forward in April 1865. There is a rotating disc and a fixed disc, the latter of which is charged by an excited plate of vulcanite. The fixed disc is opposed to the rotating disc, and has two deep notches of a peculiar shape; it is coated in two places with paper. A continuous electric current can be obtained from this

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machine. (See Poggendorff's *Annalen*, No. 9, 1865; also *Phil. Mag.*, fourth series, Vol. XXX., p. 425.)

1865. Mr. J. Stefan, in 1865, showed that a thermo-electric pair with bleischweif for the positive element, and variegated copper ore for the negative element, gave an electromotive force equal to $\frac{1}{8 \cdot 1}$ of a Daniell's element. (See Poggendorff's *Annalen*, April 1865; also *Phil. Mag.*, fourth series, Vol. XXX., p. 77.)

1866. Lieut.-General Edward Sabine, on June 21, 1866, read a paper to the Royal Society on "Results of the "magnetic observations at the Kew Observatory," in which the great and distinctive characteristic of the lunar diurnal variation is said to be most worthy of consideration. (See *Phil. Trans.* for the year 1866, p. 441.)

ELECTRICITY AND MAGNETISM:

THEIR

GENERATION AND APPLICATIONS.

A.D. 1858, January 5.—N° 18.

DERING, George Edward.—The title of this invention is "Improvements in electric telegraphs, and in the manufacture of "insulated wire and cables."

The invention consists of:—

1st. A method of communicating intelligence by means of electricity, in which synchronous pendulums or balance wheels are employed at the transmitting and receiving stations. A variety of signals are produced according to the place in the arc traversed by the pendulums or balance wheels at which the electric current is transmitted. One plan of carrying out these principles consists in causing the extremity of the pendulum at the transmitting station to move over the conducting portions of finger keys, any one of the finger keys being able to complete the electric circuit (on the arrival of the pendulum at a suitable position) when the said finger key is depressed; the extremity of the pendulum at the receiving station carries as many types as there are symbols, and an electro-magnet actuated at a suitable time, impresses the required symbol upon paper by the impact of its armature upon the spring of the type; "suitable inking arrangements are provided, and the "paper is advanced a step by the return movement of the arma-"ture of the electro-magnet, thus presenting a fresh surface for "the next letter." According to another plan both the pendulums are mounted in the way above described, the conductors of the receiving pendulum however are not in connection with finger keys but with the coils of separate electro-magnets respectively. "These electro-magnets upon being individually excited impress "different types upon paper, and thus letters are printed corres-"ponding to the key touched at the distant station." Either the

line-wire current, that from local batteries, or induced electricity may be used to work these arrangements.

2nd. A step-by-step receiving instrument. The pointer axis carries a type wheel and has a tendency to rotate imparted to it "by clockwork or otherwise," but its movement is regulated by pallets and escape wheels worked by means of separate electro-magnets. This mechanical effect in the receiving instrument is to be brought about by the transmitting instrument used in "single "needle" telegraph instruments. When not more than four transmissions of the current are to be used for any single position of the pointer, and when thirty symbols are to be made capable of transmission, five separate escapement wheels are fixed on the pointer axis so "that no two teeth shall coincide upon any two "of the wheels." The electro-magnet to actuate any given escapement wheel is magnetized by means of "relay" circuits completed by the line-wire circuit. Thus the particular escape wheel which is actuated depends upon the sequence and direction of the currents belonging to the symbol. When the current is withdrawn from the electro-magnets, a sixth escapement wheel and pallets retain the pointer in position. The restoration of the pointer to zero and the printing of the letter may be accomplished in the usual manner; two modifications of "governors" are however preferred, one consists of a heavy retarding wheel worked by a spring and electro-magnet, the other has the arm that releases the printing mechanism bearing upon a revolving screw except when an electro-magnet acts upon it. The printing mechanism may also be actuated by the receiver, and the accomplishment of the operation may then be indicated to the transmitter.

3rd. The employment of "means for obtaining simultaneously, "at the same receiving station, two or more copies of the message "by the use of a corresponding number of recording instruments "acting in concert with each other, and worked by the same "local battery power; or by multiplying in the same instrument "such portions thereof as will afford the additional copies."

4th. "Certain methods of lessening the difficulties experienced "in telegraphing through long lengths of submarine or sub-"terranean wires."

First method.—One, two, or more generators of electric force is or are placed in the telegraphic circuit. Signals are given; by "breaking the continuity of the main circuit;" by varying the

electric force in the main circuit; by reversing the direction of one or more of the currents (but not unless one or more of the currents from a distant place is or are in the ordinary direction); or by introducing other currents into the circuit in the same direction as that of the nearest battery to where the alteration is made, unless some generator of electric force be included in a distant part of the circuit.

Second method.—A telegraph line being arranged as in the first method with the exception that its continuity is broken, signals are given either "by merely completing the broken con-"nexion," or "by introducing an electric current in either "direction and of any suitable force into circuit at this place."

Third method.—The receiving instrument is made to complete "a connexion by which a current is sent into the line-wire in "opposition to the residual current antagonistic to succeeding "signals."

Fourth method.—Signals are conveyed by employing mechanical motion to complete the local or other electric circuit, or to actuate recording instruments. Either statical or induced electricity may be used to furnish the required mechanical force.

5th. Improvements in insulating wire. The separation which usually exists between the wire and the gutta percha covering is prevented; firstly, by applying a coating of varnish previously to the application of the main body of the insulating matter; secondly, by applying "to the wire a suitable solvent of the insulating "matter to be used;" or, thirdly, by heating the wire "so as to "cause the insulating matter to adhere."

6th. "New constructions of telegraph cable for submarine use." First, two or more insulated wires are formed into a rope and externally protected. Second, both iron and steel wires are used in the same cable, either or both being used as insulated conductors or in any other capacity.

[Printed, 6d.]

A.D. 1858, January 13.—N° 51.

BARLOW, Charles (*a communication from Antoine Michel Loup and Auguste François Koch*).—"An improved registering "water meter," in which the motion of the machine is transmitted to the registering apparatus by means of magnetic force.

The central and vertical spindle of the turbine, the number of whose rotations is a measure of the quantity of water flowing through the apparatus, carries gearing which transmits the rotation to another central and vertical spindle mounted at its apex with a curved bar magnet. This magnet has the axis passing through its centre, it can therefore revolve in a horizontal plane with its poles equidistant and farthest from the spindle. A thin copper covering that separates the measuring from the registering portion of the apparatus, is placed immediately over the above-described magnet, and prevents any water from entering the registering machinery. Immediately above the copper covering and mounted centrically on the lowest part of the registering portion of the meter close to the copper cover, is another magnet similarly mounted to that above described. The motion of the magnet in the measuring chamber is thus copied by the magnet in the registering chamber, and the motion of the turbine spindle transferred through a water tight cover to the registering train of wheels, no stuffing box being used.

[Printed, 11*d*.]

A.D. 1858, January 13.—Nº 54.

BRIGHT, EDWARD BRAILSFORD.—" Improvements in commu-
" nicating signals by electricity, and in the apparatuses employed
" therein."

This invention has for its object the removal of the delay caused by employing two opposite currents to produce a single signal. The reversal of the first current is usually necessary, in long telegraph lines, to neutralise the first current, but in this instance is made to produce a separate signal.

An apparatus suitable for sending currents through lines of moderate length is made to send alternating currents with pauses between; the pauses or withdrawals of the current from the line occur whenever the lever key of the instrument is released. Two spring arms are connected respectively with the line and earth wires, in the centre line between them a fixed plate and a cam are placed; the arms are ordinarily connected with one pole of the battery by means of the plate, against which they bear; the movement of the key, by means of an escapement and train of wheel work, causes the cam to press against one of the springs by a cer-

tain amount of rotation thus imparted to it. The cam, being connected with the other pole of the battery, is thus made to send the current in either direction along the line wire, according to the spring against which it presses; if it is in a central position and does not press against either spring the current is cut off from the line.

An apparatus for keeping the receiving coils on short circuit for a greater or less time after each signal, consists of a lever pressed down by the action of the finger key, the said lever being furnished at its free end with a rack in gear with a fan shaft; the lever is pressed against the pin of the finger key by a suitable spring. On depressing the finger key, the tail of the rack is removed from a spring connected with the receiving coils, and enables the spring to come into contact with a stud connected with the other end of the receiving coils, thus short-circuiting them. The time during which they are short-circuited depends upon the angle at which the vanes of the fan are set.

A relay is made to indicate signals by means of a local circuit completed by the alternating line-wire currents that pass through the relay. The action of the relay deflects an arm on its moveable axle against one or other of two screws; each deflection completes the local circuit in consequence of the arm being in connection with one terminal of that circuit and the screws with its other terminal; the local circuit comprises a local battery and the indicating instrument.

Means of bringing the relay arm into a central position after it has given its signal. The local current whilst acting upon the indicating apparatus also magnetizes an electro-magnet; the magnetized lever of the electro-magnet is thereby made to enter a cup in the end of the relay arm, and thus to bring it back to the centre, and leave it free to receive another current from the distant station, the magnetized lever having been drawn to its original place by a spring, on the ceasing of the local battery current. This method is also applied to acoustic indicating instruments, the blow of the hammer being made to complete the local circuit.

Bringing the relay arm into a central position "by the effect of "a local current so regulated as not to exceed the current received "from the distant station." The relay arm is acted upon by two electro-magnets, one excited by the line-wire circuit, the other by

the local circuit. The regulation of the local current may be effected by wire or water resistance, or by the movement and adjustment of the magnet excited by the local current.

By means of two electro-magnets and a magnetic arm in the local circuit, the local circuit may be cut off or broken after producing the signal in the indicating apparatus. This device is used when the relay arm is not required to be brought back to a central position.

In magneto-electric or other arrangements by which equal alternating currents enter the line-wire circuit, "the sending key " may be geared to act isochronously, and so arranged as to short " circuit or shut off a single current from the line wire, and at the " same time to reversing the connexions with line and earth, so " as to maintain the consecutive order of alternate opposite cur- " rents."

An apparatus consisting of a cam, spring, and catch is also described and shown, by means of which the magneto-electric or secondary coils may be cut off, "independently of the reversal of " the connexions of line and earth."

The reversal of the connexions of the line wire and earth, " in " order to signal with every current communicated, may also be " effected by means of an endless chain with slides."

When it is required to send a short current after a long one, a stronger current may be sent for a short time.

The character of the alternate opposite currents may also be regulated by interposing the resistance of water or of thin wire.

" Various codes and modes of expressing the signals may be " arranged according to the improvements herein detailed by the " use or modification of apparatus constructed on the principle " described."

[Printed, 10d.]

A.D. 1858, January 14.—N° 65.

CLARK, William (*a communication*).—(*Provisional Protection only.*) " Certain improvements applicable to the paying-out of " submarine or submerged telegraph wires or cables."

This invention consists in the attachment of buoys to the wire or cable. These buoys are intended to prevent or modify the tensional strain upon the cable during paying out; they are to

be fixed, by means of spring hooks, to the cable after it has left the vessel and before it reaches the water, and are not to remain at the surface of the water but are to sink slowly with the wire or cable.

The invention further consists of an indicator to show the tension of the cable to the person attaching the buoys. The last drum over which the cable passes previous to leaving the ship is carried by beams that rest on springs; an indicator hand has its fulcrum on one of the beams and rests on a fixed point between the fulcrum and the free end; the movements of the free end over a fixed graduated arc indicate the strain on the wire or cable.

[Printed, 3d.]

A.D. 1858, January 19.—N° 93.

VON CORVIN, Otto.—" Improvements in the mode of inlaying " or ornamenting in metals and other materials."

The first part of this invention relates to " inlaying by means of " galvanoplasty." The material to be inlaid is stamped out according to the desired pattern, and, if necessary, metallized; it is then arranged with its face laid flat on a plate of metal, and caused to adhere thereto by any suitable adhesive material. The whole is then placed in an electro-depositing bath and a deposit allowed to take place to the desired thickness and over the entire surface of the metal plate and of the ornamented material, thus enveloping the said material; the ornament is then detached from the copper plate, and the uniform surface thus obtained is polished, engraved, or further ornamented. The ornament to be inlaid may be formed by electro-deposit if preferred.

The second part of this invention relates to the " inlaying metals " or alloys in a molten state." The ornamental forms are prepared " by perforating or cutting through a substance of metal, " wood, or other material, and afterwards pouring the molten " metal therein"; after it is partially cooled, the whole is placed between two plates and subjected to pressure.

[Printed, 4d.]

A.D. 1858, January 23.—N° 125.

VASSEROT, Charles Frederic (*a communication from Messrs. Bouvery and Crestin*).—(*Provisional Protection only.*) " A " single and double acting machine, with electro-magnetic motive " power."

" The single acting machine is composed of, 1stly, a fly wheel " mounted on a shaft; 2ndly, a crank at one end of the said " shaft; 3rdly, a distributor fixed on the shaft; 4thly, an electro- " magnet coated with thread; 5thly, two attractive plates, placed " one before and the other behind the magnets; 6thly, a connec- " ting rod for the backward and forward motion, serving for the " two plates; on this rod three projecting rings are placed, one " behind the lever to which the front plate is fixed, another at the " distance required for the to-and-fro movement, and the third " behind the second lever; 7thly, two wire conductors; 8thly, a " suspension rod for the plates.

" The double acting machine is composed of two electro-mag- " nets, one at each end of the machine, the fly wheel being placed " between them. A second crank is placed at the other end of " the shaft. The backward motion in either machine is obtained " by means of a set of distributors placed on the side of those " which serve for the forward motion."

[Printed, 3*d.*]

A.D. 1858, January 29.—N° 165.

WEARE, ROBERT.—" Improvements in galvanic batteries."

In one arrangement, described in the Specification and shown in the Drawings, the elements succeed each other in the following order:—" Insulating board, zinc, porous material in small pocket, " porous material in large pocket, copper, insulating board, zinc, and " so on." The insulating board is made up of a number of veneers cemented together, a copper plate is placed on one side of this board and a zinc plate on the other, these are connected together by rivets passing through the insulating board; the small pocket which surrounds the zinc plate contains porous material that is kept saturated with a solution of chloride of calcium; the large pocket that abuts upon the copper plate is supplied with chloride of copper. These elements " are suspended by an ear at each side resting on " a glass rod." " A number of these pairs of plates are placed " together to form a galvanic battery."

In another arrangement a trough is used, the division between the cells being made up of veneers made in a similar way to the above described insulating boards, and the whole being held together by long bolts and nuts. When the plates and porous cells are raised, or the liquid is removed from the trough, the

solution in the porous cells descends into flexible and non-porous bags and leaves the zinc plates.

[Printed, 1s. 10d.]

A.D. 1858, February 4.—N° 206.

BEALE, BENJAMIN.—(*Provisional Protection only.*) "Improvements in apparatus for paying out and drawing in electric telegraph cables, applicable also to the raising and lowering of weights."

This invention consists "in the combination of a drum with a cylinder and piston, with connecting rod and the usual valves used in steam engine cylinders." "The drum may be used as the paying-out agent, or it may be applied and act by friction upon one or between two other paying-out drums. When paying out the apparatus works simply as a break, but when desired to draw in or draw back the cable it then acts as a motive-power engine, and works in the reverse direction to that it travelled in when driven by the friction of the cable."

According to one method of carrying out this invention the running out of the cable sets one or more reciprocating non-condensing engines to work, these engines being connected to the shaft of any of the paying-out machines; during this operation these engines act as pumps, "forcing and drawing air or other fluid through the induction and eduction pipes." To draw in the cable the engines are worked by steam in the usual way, the steam being admitted through the eduction pipe of the former arrangement, and having its exit through the former induction pipe. Suitable valves are provided to enable the machinery to work either way.

[Printed, 3d.]

A.D. 1858, February 10.—N° 252.

CHATTERTON, JOHN.—"An improvement in electric telegraph wires and in insulating telegraphic wires."

The inventor states:—"My invention consists in causing the wire or strands of wire to pass through a vessel fitted with suitable guages, and containing an insulating compound of gutta percha or suitable material, rendered more or less fluid by the addition of a solvent immediately before they enter the

" machine which puts on the ordinary covering of gutta percha. " By this process I secure complete adhesion between the " conducting wire and the gutta percha, and also more perfect " insulation than can be obtained by a single covering of gutta " percha. I apply the same process when two or more wires are " used twisted or laid together. I also electroplate the copper " wires which I employ for electric conductors, in order to render " them more suitable to be used for this purpose.

" In long lengths of telegraph lines I gradually diminish the " size of the conducting wires, so that as the electric currents " become weaker they will have suitably sized conductors."

[Printed, 3d.]

A.D. 1858, February 11.—N° 258.

LOOKER, Benjamin, jun.—" Improvements in sockets for " receiving telegraphic and other posts or uprights."

The inventor states as follows:—" This invention has for its " object improvements in sockets for receiving telegraphic and other " posts or uprights. For this purpose the sockets are composed " of earthenware, by preference of stoneware, the exterior being " glazed and the interior glazed or left unglazed. Each socket is " made with a foot or enlargement at the lower end, and the " bottom is closed so as to prevent any moisture or water passing " up from below into the the interior of the socket. The sides of " the socket may be strengthened by being formed with ribs on the " exterior or interior, or both. These earthenware sockets may be " moulded in any convenient manner, but I prefer to cause them " to be moulded by expressing the clay through dies or openings " of suitable form, and they may be arranged for producing the " foot or lower end, or such foot or lower end may be applied after " the upper part has been moulded by expressing the clay through " the moulding dies or orifices."

[Printed, 6d.]

A.D. 1858, February 11.—N° 262.

KEATINGE, William.—(*Provisional Protection only.*) " Im- " provements in correcting variations in the mariners' compass " from local attraction."

" The invention consists in the application of a mechanical

" arrangement to the ordinary marine compass, whereby the needle " is retained so as as to secure the true [magnetic ?] north."

A small square plate is attached to the cup of the compass card by means of certain horizontal and vertical shafts connected by an arrangement of universal joints, so that when the card moves by the action of the needle these appendages will revolve with it. " From each side of the little square plate," a small weighted wire is suspended " in such a manner that they shall hang parallel " to the sides of the plate when they are perpendicular." This apparatus is balanced by means of horizontal bars furnished with shifting weights. " Should the needle, by any local attraction, " be drawn from that position which on the card indicates the " true north, the square plate moving with the card will lift either " one or other of the loaded wires, so that the one raised will be " on the extremity of a greater lever than it was in its previous " position, consequently if the weights are properly calculated, it " will return to its place, and retain the needle at the given " point."

[Printed, 3d.]

A.D. 1858, February 13.—N° 277.

SIEVIER, John Cornish Harcourt.—" Improvements in " submarine conductors of electric telegraphs."

The object of this invention is to enable the copper conducting wire to " become more easily insulated than it would otherwise " be" by coating it " with a metal or alloy or combination of " metals having a much less degree of conductibility than copper."

This invention " consists in coating copper wire to be employed " as a submarine conductor of electricity with bismuth, tin, iron, " lead, brass, antimony, zinc, nickel (by preference containing " arsenic), or German silver, or with any combination or alloy " of two or more of these metals, prior to the treatment of such " copper wire with any means of insulating, either by gutta percha, " shellac, tar, bituminous or resinous substances, fibrous materials, " or other substances, and likewise prior to the application of the " wire cable."

Bismuth or lead is, by preference, employed as the exterior metallic coating; bismuth because of its " slight amount of con- " ductibility," and lead because it " is absolutely imperishable in

" sea water, and becomes coated with saline matters, which not " only preserve it from decay, but cause the most perfect insula- " tion of the conducting wire."

The conducting wire coated as described above—either by electric power or otherwise—may be coated with gutta percha, the gutta percha metallized and a similar sequence of metallic coatings take place upon that, another coating of gutta percha, and so on, until the requisite insulation and resistance to the action of the sea water is attained.

[Printed, 4d.]

A.D. 1858, February 15.—N° 279.

SPENCE, William (*a communication from Messrs. Digney, Brothers*).—" Improvements in telegraphic apparatus."

This invention relates to certain improvements applied to the " Morse telegraph," and to the " French telegraph." The printing arrangements applied to either of these instruments consists of a band of paper, inking disc, and hammer; when the electric current passes, the hammer presses the strip of paper against the inking disc, and a mark, more or less long is thus formed.

In the application of this improvement to the " Morse tele- " graph," the tracing disc receives from the clockwork a rotary motion in a direction contrary to the advance of the paper, and " is fixed on an axis independently of the lever, such axis not " changing its position." In the Morse relay, the electro-magnet " is placed on a carriage capable of moving in a slide."

In the application of this improvement to the " French tele- " graph " the printing arrangements are similar to those of the Morse apparatus above described. The transmitting instrument is made to send intermittent currents only when the hand of the indicator is seeking the letter to be transmitted and printed; when, however, the letter is arrived at by the pointer, the operator depresses the key of the transmitting instrument instead of advancing it, and causes a reversal of the current to take place, this reversal calls the printing mechanism into action, and the corresponding symbol is impressed on the travelling paper band. The printing mechanism may either be actuated by a local battery called into action by the line-wire circuit, or by the line-wire circuit itself, but the former is preferred.

Instead of reversing the current in order to print a given letter, it may be augmented in intensity or in duration of action, the apparatus at the transmitting and receiving stations being arranged accordingly.

One of the principal arrangements in this apparatus is the use of a sinuous wheel in the transmitting instrument, the said sinuous wheel having as many wavings as there are teeth on the escapement wheel of the indicator, or "as there are characters on "the dials and on the disc intended to print."

Many details, relating to the precise method of accomplishing the above results, are described in the Specification and shown in the Drawings.

[Printed, 1*s.* 9*d.*]

A.D. 1858, February 15.—N° 282.

HUNT, Edmund.—(*Provisional Protection only.*) "Improve-"ments in voltaic batteries, and in means for producing the "electric light."

1st. Improvements in double-fluid batteries. "In place of the "porous earthenware cell and negative metallic plate," a cell of carbon or graphite is employed "as the electro-negative element, "and which serves as the receptacle for the nitric acid or other "fluid used." It is preferred to form these cells by a mixture of "finely divided coke, graphite, charcoal, or other carbon," "with a sufficient quantity of tar, oil, or other suitable hydro-"carbon"; the cohesion of the mixture is ensured by moulding it into the desired form and subjecting it to a red heat, "and by "repeated alternate immersion in tar, or other such material, and "exposure to intense heat, any desired amount of density may be "given to the carbon cell or vessel."

"In some cases it is desirable, after completing the carbon cell "to the required density, to wash the interior with a mixture of "clay and water, or carburet of iron and water, or with a mixture "of both, and, after carefully drying the same, to subject it to an "elevated temperature."

2nd, "The manufacture of electrodes, or carbon points, for "producing the electric light." The residuum from the distillation of tar or pitch is reduced to an impalpable powder, and mixed with tar or other hydro-carbon; with this material the

electrodes are moulded of the desired form, they are then subjected to a red heat, immersed in tar, again heated, and so on "until the "desired density is obtained."

[Printed, 3d.]

A.D. 1858, February 16.—N° 293.

WILDE, Henry.—"Improvements in connecting the ends "of lightning conductors, and also the ends of submarine electric "telegraph cables."

The end of the copper rope is put through a short copper cylinder, the end of the rope is then untwisted and the wires bent over the outside of the cylinder, one by one; the wires are then laid in regular succession round the cylinder and cut to the length of it. A second cylinder "closed at one end and screwed internally "at the other, is driven tightly over the wires and the other cylinder, "a small cap being previously slipped on the copper rope, is "screwed into the end of the cylinder, which is screwed internally "to prevent the small cylinder coming out." A male screw is made on the outside of the coupling to screw into the elevating rod.

In another method, a conical copper cylinder, screwed outside, with longitudinal slots and flanged end, is used; in this case the wires are bent over the face of the flange and are secured against another flange. A conical nut compresses the cylinder to the copper rope.

The ends of electric telegraph cables are treated as first described, the outside wires alone being fastened, the electrical conductors are joined in the usual way. Two other metal cylinders are driven over the wires, and the whole is filled up with gutta percha; a metal tube, screwed internally at each end, covers over the whole, and a cap (slipped over the end of each cable before the joint is made) is screwed into each end of the tube.

[Printed, 9d.]

A.D. 1858, February 16.—N° 296.

MENNONS, Marc Antoine François (*a communication*).—(*Provisional Protection only*.) "Certain improvements in voltaic "batteries."

"This invention consists in the application of the metal alumi-
"nium as a substitute for the zinc or element termed 'zincode'
"in voltaic batteries.

"A cylinder of aluminium is substituted for the zinc in Bunsen's "battery, (for instance,) the charcoal being placed in a porous "vessel filled with nitric or other acid diluted or not, the outer "vessel containing the aluminium is charged with sulphuric or "other acid, diluted or otherwise; a constant voltaic current is "thus obtained.

"Hydrochloric acid (or its compounds) may in some cases be "employed, although it has the disadvantage of attacking the "aluminium."

[Printed, 3*d*.]

A.D. 1858, February 16.—N° 297.

NEWTON, Alfred Vincent (*a communication*).—(*Provisional Protection only.*) "Improved apparatus for laying submarine "telegraph cables."

1st. The employment of the resistance afforded by pumping water, &c., as a brake in paying out telegraph cables. The pumps are geared to the shaft or the paying-out drum, and have their discharge pipes of small capacity in proportion to the capacity of the pumps and of the suction pipes thereof.

2nd. An automatic regulating apparatus for controlling the amount of opening in the discharge pipe of the above-mentioned pumps. The cable passes over a travelling carriage which oscillates according to the strain on the cable, and this carriage carries an arm or stud working in the slot of the lever that operates upon the regulating valve.

3rd. "Constructing each of the paying-out drums (when pro-"vided with more than one groove to permit of the cable passing "more than once round) of sheaves, each groove being a separate "sheave, and one of the sheaves being fast to the shaft of the "drum while the others are loose thereon, but clamped to the "fast sheave so as to produce a considerable amount of friction "between them." If from any cause one of the sheaves should be larger than the others, any undue strain on the cable is obviated by the slipping of one or more of the sheaves.

[Printed, 3*d*.]

A.D. 1858, February 18.—N° 317.

SYERS, John Milne.—(*Provisional Protection only.*) "Im-
"provements in the decomposition of salt and in the abstracting "of metals from their ores."

The inventor states:—"I take any ore or ores in which is "contained or supposed to be contained metal, and put it in a "vessel containing water; I then take wires of different metals and "immerse the ends in the vessel afore mentioned; the other ends "I lead and immerse respectively in vessels containing chloride of "sodium and water; this being done galvanic action takes place, "and the metals in the ores are conveyed into the vessels con-"taining chloride of sodium and water; thus silver wire will "convey silver, copper wire will convey copper, and so on. The "metals thus deposited may be afterwards reduced or used by "any of the methods at present known. I do not confine myself "to the use of chloride of sodium, as most other salts will pro-"duce the galvanic action as above described."

[Printed, 3*d.*]

A.D. 1858, February 19.—N° 323.

COOK, James Edgar.—"Improvements in binnacles or appa-"ratus for holding marine compasses."

The object of this invention is to do away with "the deranging "influence of local attraction, and at the same time" to preserve "all the lively power and effect of the needle."

The Specification describes, and the Drawings show a binnacle which is itself mounted in gimbals, the support for those gimbals being "a pair of columnar or other standards springing from or "affixed to a suitable base." The compass is held in the usual way by gimbals within a cylinder of "cork or other suitable non-"conducting material," which may be fixed to the binnacle or attached to it by means of gimbals. It is preferred to make the binnacle of iron, steel, or "homogenious metal"; the space between the cork cylinder and the binnacle (when the cork cylinder is fixed to the binnacle) "may be filled up with any suitable non-"conducting material."

The Provisional Specification makes no mention of supporting the cork cylinder or the metallic binnacle upon gimbals.

[Printed, 7*d.*]

A.D. 1858, February 20.—N° 329.

THOMSON, William. — "Improvements in testing and "working electric telegraphs."

1st. Testing the insulation of a telegraphic wire "by communi-"cating a charge of electricity to it, and then leaving it with both "ends insulated, and some part of it connected by a conductor "with an instrument for electro-static potential." The "hetero-"static electrometer" used is not effected when all the parts are electrified to the same potential; the indications of the "idiostatic "electrometer" depend "simply on its own potential as com-"municated by connection with the bodies to be tested."

2nd. Testing the insulation of a telegraphic wire "by comparing "its resistance to the flow of electricity from a constant source "with the resistance of a standard wire to the flow of electricity "from the same, or another constant source." A standard wire and galvanometer or electrometer are used for this purpose in conjunction with the telegraph wire to be tested.

3rd. Testing "a submarine telegraph wire during the operation "of laying it by measuring from time to time the strength of "currents produced in it by the electro-motive force of a constant "battery or batteries." A peculiar form of galvanometer is used, in which the indicator is suspended "by a stretched fibre passing "through its centre of gravity."

4th. The use of "a double bifilar suspension for the indicator in "any electrometer, galvanometer, relay," or other instrument used for testing or working electric telegraphs by means of an indicator.

5th. Using the filament of suspension in the indicators of electric telegraphs, or in telegraphic testing instruments, as an electric conductor, so that electric circuits may be made or broken by the motions of the indicator. When none of the filaments are conducting, "and when it is desired to have a circuit or circuits "made or broken by the motion of the indicator," a conductor connected with the said indicator is made to dip into a conducting liquid "to maintain the electric communication between the "indicator and the fixed parts of the circuit or circuits."

6th. Using an indicator which consists of two magnets, one of which is deflected by a positive current only, and the other by a negative current only. The indicators are kept in their mean

position either by the tension or torsion of filaments, or by the deflecting action of fixed magnets, and by stops. By using electro-motive forces of different strengths only certain indicators will move, according to the strength and direction of the force. The deflections of the indicators may either be used as signals or to complete forwarding or local circuits in the manner of a relay.

7th. A galvanometric relay or receiving instrument acting upon "secondary" indicators by means of "primary" indicators. The indicators or magnets of the primary indicators move in a horizontal plane, in a direction corresponding to the direction of the electric current. The axes of the secondary indicators are also vertical and are fixed at successive distances along the arc traversed by the primary indicator, if currents of different strengths are allowed to act upon the primary indicator, one or more of the secondary indicators is or are deflected according to the amount of deflection of the primary indicator.

8th. The use of either of the electrometers described in the 1st part "as receiving instruments for telegraphic signals made by "electricity other than frictional."

9th. "The use of the thermal effects of rays reflected from the "indicator," "for the purpose of receiving, recording, or trans-"mitting telegraphic signals." The "thermal effects" may be either the melting of a moving fusible substance or a chemical change produced by heat. If desired, the radiant heat may excite thermo-electric effects in local circuits, the number of local circuits being dependent upon the extent of deflection of the indicator; these local circuits may "produce motions in moveable "magnets or indicators, by which the electric currents to do the "work wanted may be checked or permitted to pass as re-"quired."

10th. "The use of photography" "for receiving and record-"ing telegraphic signals." The light from an indicator, or the image of the said indicator, is made to impress itself upon a travelling band of sensitive paper; the movements of the indicator are thus recorded upon the said paper.

11th. A method "of transmitting messages between one or "more conductors and a different number of conducters." When two submarine lines are used in connection with one shorter submarine line, each single indication from each of the long lines

makes (by means of a relay) a corresponding secondary signal at equal and alternate intervals of time; the secondary signals are forwarded along the single line. By means of this part of the invention two or more messages can be sent at the same time from the same station along one telegraph wire; one instrument is allotted to each message and each has a conductor leading to the telegraph wire; at any one time the keys of all the instruments excepting one are locked, "so that the keys of one instrument "only can move at any one time, and the keys of all the instru-"ments used can be successively moved;" the effect of this arrangement at the receiving station is that the letters from each instrument arrive in a certain order, and if the same order is preserved in reading off the letters and allotting them to the words of which they form a part, as that which is observed in sending them from the different instruments, the signals from each instrument can be easily decyphered. One mechanical arrangement for locking the keys in the proper order consists of a rotating grooved cylinder into which pins from the keys can be made to press at regulated intervals of time.

12th. "The use of electric sparks" "for receiving or recording "telegraphic signals by means of marks, impressions, chemical "changes, or perforations produced by these sparks." The sheet that receives the marks by which the motion of the indicator is recorded is carried along by a regular motion. Photographically sensitive paper is preferred as the recipient of the marks.

13th. "The use of a transmitting instrument, adapted to send "currents of various measured strengths, combined with a re-"ceiving instrument, adapted for receiving and recording the "deflections of the indicator caused by the different strengths of "current, and for giving a variety of signals thereby." One instrument, described in the Specification and shown in the Drawings, carries studs connected with the coil at different points, so as to enable the current to be measured into the line-wire circuit; when a current is received from a distant station through the coil, it deflects a needle carrying a mirror according to the strength of the current sent; the signal is indicated by the motion of a spot of light from the mirror; in this instrument the normal position of the indicator is regulated by means of an adjustable permanent magnet. In another instrument the sensitiveness of the indicator and its normal position are regulated by means of

two coils (at right angles to the deflecting coil) through which a constant current is transmitted.

14th. "Methods and apparatus" "for rapidly producing and "for maintaining electric currents of stated strengths in telegraphic wires, and for discharging currents from such wires." A pendulum and clockwork apparatus is used to apply a positive electric current of a certain strength for one-third the time allotted to each signal, a similar negative current is then sent for the same time, and finally a weak positive current. The pendulum and clockwork apparatus locks the keys at definite intervals of time, and is adapted to send currents according to the 11th part of this invention; cams, cam springs, and levers are used in this apparatus.

15th. In working through a telegraph line of considerable resistance in both directions at once, to avoid the consequent violent action of the receiving instrument at the transmitting end, by transmitting signals from that end through it, the said receiving instrument is thrown out of circuit "during certain parts of the "time during which a signal is being transmitted from that end." The time during which the signal is transmitted is regulated by the arrangement of cams and springs described in the 14th part of the invention. The time during which the receiving instrument is thrown out of circuit is regulated by a separate wheel on the same arbor with proper cams.

16th. The effects produced on the receiving instrument at the transmitting station are compensated by means of operations performed at that station; a compensating current or a moveable magnet may be used for that purpose.

17th. In working in both directions at once, each electric signal is either made "simultaneously at the two ends, or alter"nately at definite intervals of time." For this purpose a mechanical apparatus is employed at each end, the said mechanical apparatus being "regulated according to an independent clock, or "worked by clockwork."

18th. "The use, for receiving and recording signals, of two or "more instruments at or near the same station, thrown into "operation during regulated intervals of time." The mechanism described under the 14th head of the invention is used for this purpose.

19th. Checking the motion of a moveable indicator after its

indication has been read off. This is accomplished by a magnet or vessel of liquid. This part of the invention, mentioned in the Provisional Specification, is not proceeded with in the Complete Specification.

20th. To increase, diminish, or regulate the stability of the moveable magnet of an indicator, wires conveying adjustable currents of electricity are used; the adjusting coils mentioned under the 13th head of this invention are preferred for this purpose.

21st. Compensating the effect of the electrification of the telegraph wire "remaining over from previous signals" by using "in the neighbourhood of the moveable indicating body an "electro-magnet or coil of wire conveying a current instituted "and regulated to produce the desired effect, or a steel or other "magnet, moved so as to produce the desired effect." In the Complete Specification this part of the invention is only retained so far as it is comprehended under the 16th head.

22nd. A method and apparatus "for producing, at a receiving "station, lines, figures, letters, or symbols of given shapes." At the transmitting station the lines or symbols are drawn "upon "an instrument adapted to give different degrees of electro-"motive force" to two separate telegraph lines. Each of these lines has its own indicator and mirror to record the motion of a ray of light, and by this means to present a copy of the figure or symbol at the transmitting station. For this purpose the ray of light is first reflected from one mirror, then from the other. By the addition of a third telegraph wire, and an electro-magnet in its circuit, "when the tracing point at the "transmitting station is lifted from the surface on which the "curve is drawn," the recording beam of light is cut off at the receiving station.

[Printed, 1s. 6d.]

A.D. 1858, February 20.—N° 333.

BAUDOUIN, Félix Marie.—"Improvements in electric tele-"graph cables."

The cable which is the subject of this invention has an iron wire core, which is of sufficient sectional area to resist the tensile and other strains to which the said cable is exposed during the

paying out and when laid. This core is also used as the electric conductor, and is preferred to be of several strands, made according to the usual method of manufacturing wire ropes. The external covering of the cable is non-conducting, and is made of the ordinary insulating materials.

When such protection is required, iron wire coverings may surround the insulating material. Iron or steel wires and layers of impervious textile material may be alternated where great protection to the insulated core is required. These mechanical preservative coverings may, by means of suitable machinery, be applied to the cable "when on board, at the time of the immersion," "of a nature and strength appropriate to the local conditions "which are to be satisfied." This method can be applied to existing cables, and the coverings may be such as only to temporarily protect the cable during submersion.

Multiple conductors are made by uniting several made as described above, and included in the same common envelope, or by interposing insulated copper wires in the strands of the core of the cable.

Aluminum and its alloys may be used as a material for the core of this cable, and the said core may be covered "like the "base covered strings of musical instruments," so that if the central wire should break there may still be some metallic contact.

[Printed, 5*d*.]

A.D. 1858, February 22.—N° 341.

SCHAUB, George.—"A new or improved manufacture of "certain kinds of printing type and other printing surfaces."

This invention relates to the manufacture of "the large printing "types which are usually made of wood or of the alloy called "type metal, or of type metal mounted upon wood;" also to the manufacture of "blocks, stereotypes, and such other printing "surfaces as the same is or may be applicable to."

"The well known process of electro-deposition" is used to make the head or printing surface of the type; the copper head thus made is firmly attached to a hollow cast-iron body "by screws, pins, or otherwise," and is made to imbed itself firmly on the said cast-iron body by placing Keene's cement or other cement, composition, or soft metal between the type head

and the cast-iron body. "The type head may be strengthened by "tin or solder fused to its back."

The type is given the required height "by placing it, or a "number of the said types together, face downwards, upon a "plane surface, and by a planing machine" cutting "away the "edges of the type body" "until the type or types have been "reduced to the required height."

Although the method of making the type head by electro-deposition is preferred, "yet the said type head or printing "surface may be made from sheet metal by the well-known "process of raising in dies."

[Printed, 5*d*.]

A.D. 1858, February 23.—N° 353.

SHEPARD, EDWARD CLARENCE. — (*Provisional Protection only.*) "An improvement or improvements in depositing metals "and metallic alloys by electricity."

This invention relates :—

1st. "To producing by means of an electric current and an "anode or plate of silver alloyed with nickel, a deposit of alloy "of silver and nickel." The depositing solution is made as follows :—Carbonate of ammonium is added to nitrate of silver until the precipitate produced by the mixture is entirely re-dissolved; the precipitate obtained by adding carbonate of potash to nitrate of nickel is also dissolved in carbonate of ammonium; these solutions are then mixed, and, if the resulting solution does not deposit rapidly enough, cyanide of potassium is added.

2nd. "To give to iron, zinc, and other metals the appearance "of bronze, brass, copper, &c." To make the depositing solution, cyanide of potassium is added to sulphate of copper until the precipitate formed by the addition is entirely re-dissolved; a solution of sulphate of zinc in cyanide of potassium is also made; to complete the solution caustic potash and "cream of tartare" are added to the mixed cyanide solutions. "To make the color "of the brass red you use a copper anode or plate; to make the "color green you use a brass anode; when you want a rich color "like gold thrown upon any metal, the solution should be made "warm or hot while working."

[Printed, 8*d*.]

A.D. 1858, February 24.—N° 358.

HOBBS, Alfred Charles. — (*Provisional Protection only.*) " A domestic bell telegraph."

" A button in the room to which the main wire from the bat-" tery is connected being pressed to its seat, the current before " broken is continued through its special wire, which passes over " its own horseshoe or other electro-magnet; this then attracts " its armature from its previous position, where, by means of a " pin or other device attached to it, a shield is prevented from " falling of its own gravity; the pin thus withdrawn, the shield " falls and discloses the number or signal. The current is then " continued along the wire to a horseshoe or other electro-magnet " which is common to all the wires, attracts its armature, to " which is attached a device for ringing or striking the bell, at " the same time completing the circuit."

[Printed, 3*d.*]

A.D. 1858, February 27.—N° 393.

HENRY, Michael (*a communication from Messieurs Grenet and Vavin*).—" Improvements in electro-magnetic motors."

The distinguishing features of the electro-magnetic engines to which this invention relates are as follows:—

1st. By the action of the electric current and of the distributing apparatus connected with the machine, the electro-magnets are " caused to roll or move on other electro-magnets," and their motion is transmitted to the motor shaft by means of connecting rods or levers and cranks, so as to give continuous motion to the engine.

2nd. The electro-magnets act reciprocally " until they come in " contact," and each commences to act upon its crank when the said crank is at an angle of 45° to the line of direction of the force and continues to act until the crank reaches an angle of 90° to the said line; the contact of the magnets then takes place, the action of the current thereon ceases, and is transmitted to another pair. " To obtain continuous action the cranks are mounted on " the shaft in pairs, each pair forming a right angle."

3rd. In the distributing apparatus metal rods are used which are " free to move " in baths composed of mercury and distilled

water. The spark upon breaking contact with the mercury is thus prevented.

4th. A "counter-current" is employed to drive off the residual magnetism of the electro-magnets "at the precise moment at "which the main current ceases to magnetize."

Two machines are shown in the Drawings, in one the electro-magnets act directly on the driving shaft by connecting rods, in the other a number of electro-magnets act upon the driving shaft by means of rods (to which they are attached), levers, and connecting rods.

[Printed, 10*d*.]

A.D. 1858, March 3.—N° 424.

FOWLER, John, jun. — (*Provisional Protection only*.) "Improvements in apparatus employed in laying down electric "telegraph cables."

"In order to reduce the weight or strain on the cable (in deep "seas)," "the cable is caused to descend in contact with a succession of pullies in such a manner as to press thereon and give "motion thereto. The axes of the pulleys have attached to them "paddles or vanes, which by their rotation offer resistance to the "rotation of the pullies, and consequently to the movement of "the cable, so that the weight of the cable hanging between the "ship or vessel and the bottom of the sea, will be reduced according to the number of the pullies interposed, the pullies in succession supporting the weight of the cable at intervals more or less "near together, according to the circumstances of the particular "case. The pullies are carried by means of two cables or ropes, "which descend from the ship or vessel to a greater or less depth, "according to the extent to which it is desired to give support to "the electric telegraph cable." "The two ropes or cables may "be more or less buoyed or supported by having the pullies "attached thereto hollow, or by other means, in order to reduce "the strain on the upper parts of such cables or ropes."

[Printed, 3*d*.]

A.D. 1858, March 4.—N° 437.

THOMSON, William.—"Improvements in apparatus for applying and measuring resistance to the motion of rotating

" wheels, shafts, or other rotating bodies;" this invention may be employed in laying submarine electric telegraph cables.

1st. The application of a "regulated force to a frictional chain " or band of any kind for resisting the motion of a rotating body " at that end or part of the chain or band where its tension is " greatest, so as to prevent the possibility of the resistance be- " coming greater than that regulated force." The regulated force may be either a weight, an elastic spring, or human force, acting by means of mechanism or not. A spring balance or other measuring apparatus is applied to the end of the frictional band opposite to that upon which the force is made to act, or to some other part of the said band.

2nd. The application of the regulated force, as above, when one frictional band resists the motion of two or more rotating bodies.

3rd. The use of the above-described machinery for laying submarine cables. In this case the rubbing surface of the chain or band may be renewed by causing the said chain or band to move longitudinally.

4th. "The application of these arrangements to the measure- " ment of motive power."

In performing all the parts of this invention, the frictional band may be drawn out of contact with the rotating body or bodies by means of springs attached to the frictional band and to fixed points, when no tension is applied to the said frictional band.

[Printed, 4*d.*]

A.D. 1858, March 5.—N° 444.

HEARDER, JONATHAN NASH.—" Improvements in submarine " telegraph cables."

To diminish the Leyden-jar charge of an electric telegraph cable, the conductor is covered " with cotton, silk, wool, hair, flax, or " other fibrous or porous substances in any of their forms, in one " or more layers, previously to coating it with the plastic insu- " lating medium, and if necessary by putting on subsequent " alternate layers of fibrous covering and insulating coating, " which latter may be gutta percha, india-rubber, or any plastic " insulating composition."

Instead of coating the conductor immediately with the porous substance, it may be first coated with the insulating medium and then covered with the porous substance, " repeating the applica-

"tion of alternate layers of fibrous or porous and insulating ma-
"terial as often as may be required."

It is recommended to place a porous layer next to the conductor, then an insulating layer with a porous layer external to it; the last porous layer is protected by a waterproof sheath.

When two or more conductors are embodied in the same cable, they are prepared in any of the ways above mentioned, and they are either bound together with the porous materials above described and covered with the insulating medium, or they are united and covered with the insulating medium at once; or the porous material and the insulating medium may be applied, in alternate layers, over the whole.

[Printed, 4d.]

A.D. 1858, March 5.—N° 446.

JOHNSON, John Henry (*a communication from Jean Joseph Etienne Lenoir*).—"Improvements in railway signals." These signals are worked by means of electro-magnets.

This "invention relates to a peculiar construction, arrangement, "and mode of working signals placed at suitable intervals along "railways, whereby the passage of a train is instantly indicated "by a signal, which signal continues to show 'caution' or "'danger' until the next signal has been passed by the train, "thus enabling a determined distance to be observed between "each train, by which means all collisions may be avoided."

The signal consists of a metallic disc placed on a signal post "and having an aperture in the centre, which aperture is covered "by a colored glass to indicate 'caution' or 'danger,' or is left "uncovered when the line is 'all clear.'" The lever carrying the glass is connected to a second lever worked by electro-magnets; by this means the requisite motion of the glass is accomplished. The electric current is excited by a galvanic battery on one of the carriages of the passing train; one pole of this battery is connected with the rail, the other with an insulated blade spring, which makes electric contact with a metal bar in connection with one pair of electro-magnets at the signal post being passed and with another pair of electro-magnets at the preceding signal post. The former pair of electro-magnets covers the aperture with the coloured glass, the latter pair removes the coloured glass of the preceding signal post.

[Printed, 6d.]

A.D. 1858, March 6.—N° 453.

WILKINSON, WILLIAM.—(*Provisional Protection only.*) "Im-
" provements in the means of facilitating communication across
" seas or other waters, parts of which are applicable to telegraph-
" ing on land."

1st. "The establishment of a station or series of connected
" stations across seas or other waters, such stations consisting of
" floating buoys, platforms, ships, or other vessels, upon which
" suitable offices or buildings may be erected, where required,
" for the convenience of clerks, manipulators, or other persons,
" and between which electric telegraph cables, flexible gas tubes,
" or other suitable contrivances for signalling or lighting, may be
" extended." "Connection is to be made with the neighboring
" shore from each of the extreme stations, so that complete com-
" munication may by these means be made across seas or other
" waters from shore to shore."

2nd. The formation of the submerged portions of the buoys or other vessels, employed as above described, with apertures having angular partitions. The angular partitions "allow the water to " pass them readily."

3rd. Weighting the telegraph ropes between the above-mentioned stations with metal rings; the said rings are protected from oxidation by enamel or other means.

4th. The substitution of "large dials with indicators from
" several stations upon each in place of the numerous small dials
" at present employed." This portion of the invention is applicable either to land or to submarine telegraphs.

[Printed, 8*d.*]

A.D. 1858, March 10.—N° 486.

GEE, JOHN FEARNE.—(*Provisional Protection only.*) "Im-
" provement in the joining of earthenware pipes for drains, sewers,
" and telegram wire conductors; also suitable for the conveyance
" of liquids, gas, and steam under pressure, when jointed."

"The invention consists in the use of lock, semicircular, rabited
" joints in connecting two pipes or tubes or a series of pipes or
" tubes, and which joints are protected by semicircular earthen-
" ware coverings at each joining, whereby the joinings are ren-
" dered close and secure, and impermeable by liquids, gas, or

"steam, and by the use of which peculiar joints, with their covers, "any one or more of such pipes or tubes may be removed from a "connected series thereof, and replaced without injury or dis- "turbance to the remainder of the series. When earthenware "tubes connected by joints of such novel invention are intended "to be used as telegraph wire conductors, such may be made in "circular or semicircular portions, with the conductors of wires "placed at any given distance with eyelet holes or guiders, of the "given number of wires required, fixed in a novel manner, inter- "nally introduced."

Certain forms of joints, and methods of fastening pipes that are required for liquids, gas, and steam, are also described in detail.

[Printed, 3d.]

A.D. 1858, March 12.—N° 506.

NEWTON, Alfred Vincent (*a communication*). — "A new "combination of instruments for extracting teeth," which miti- gates the severity of the operation.

"The inventor combines a common dental forceps with a "magneto-electric machine in such manner that a wire from one "pole of the machine shall form a metallic connection with that "part of the forceps that grasps the tooth, while the other pole of "the machine is brought into connection with the patient's hand "by a second wire. The handles of the forceps which are held "by the operator are better to be insulated by a covering of gutta "percha or similar non-conducting substance. As the jaws of "the forceps close upon the tooth where it is surrounded by the "gum, the induced current from the magneto-electric machine "passes through the wire connecting the machine with the forceps, "and, applying itself round the whole tooth in the vicinity of the "nerves, so affects the nerves as to render them temporarily "insensible."

Any form of magneto-electric or electro-magnetic machine may be used for the purposes of this invention, or a current from a suitable galvanic battery (with an interposed break) may be sent through the tooth.

The negative pole of the electric apparatus is connected with the forceps and the positive pole with the patient's hand.

[Printed, 6d.]

A.D. 1858, March 12.—N° 507.

CORBELLI, Luigi Ferrari (*partly a communication from Vincent Riatti*).—" An improved process for extracting aluminium " from its compounds, and obtaining at the same time proto- " chloride of mercury."

An electro-depositing solution is made that contains a salt of alumina and either chloride of calcium or chloride of sodium. This liquid is electrolysed with a weak electric current and with a positive pole of mercury and a negative pole of zinc. " A gal- " vanic action being now set up, the salts of alumina will be " decomposed, and the aluminium will be deposited upon the zinc " plate either in the form of a blackish powder, or in a thin com- " pact sheet. During this operation the chlorine will be set at " liberty, and having a great affinity for mercury, it will combine " with that metal, and form therewith protochloride of mercury " (commonly known in commerce as calomel), which will be found " deposited on the surface of the mercury at the bottom of the " vessel."

[Printed, 3*d*.]

A.D. 1858, March 22.—N° 594.

DAVIES, George (*a communication from C. P. Nézeraux*).— (*Provisional Protection only.*) " Improvements in the metallization " of objects for the electrotype or galvanoplastic process."

The object is first " rendered impermeable by a coating of " drying oil, varnish, wax, gelatine, stearine, or other suitable " material which is allowed to dry." The parts which are to be submitted to the electrotype process are then to be coated by a very soft brush with a mixture containing " yellow amber or " succinum," mastic, bitumen of Judæa, fat oil, and spirits of turpentine. Very thin metallic leaf is applied to this coating and caused to adhere to it before it is quite dry. " The object being " thus perfectly coated and the coating quite dry, is to be washed " in water slightly impregnated with cyanide of potassium," and then plunged into a cold alkaline bath composed of acetate of copper, sulphate of soda, cyanuret of soda, carbonate of soda, and water. " This bath has the effect of covering the metallized " object with a thin film, which gives it a greater affinity for the " electro-metallic coating. The object is then connected with the

"battery and plunged into a bath of sulphate of copper, and left "until the metallic coating is sufficiently thick."

[Printed, 8d.]

A.D. 1858, March 26.—N° 638.

MOXON, WILLIAM, CLAYTON, JOHN, and FEARNLEY, SAMUEL.—"Improvements in machinery for paying out electric "telegraph cables, ropes, and other like articles."

"The breaks, in the form of straps or hooks, are suspended by "fixed rods or bars from the short arms of two levers; a shaft "serves as the fulcrum for the two levers, and this shaft is sup-"ported in bearings in a suitable frame. The long arms of the "levers are or may be made in the form of loops, and these arms "receive a shaft or roller which is capable of running to and fro "thereon; upon the roller is a pulley, over which the cable to be "payed out is passed. The extremities of the roller or shaft carry "other pulleys, one on each end, and weights are connected "directly to the roller or shaft or to the pulleys by chains or "cords in such manner that upon the roller or shaft travelling "on the arms towards the short arms of the levers, the cords or "chains carrying the weights become wound round the roller or "the pulleys, whereby the strain exerted by the weights is main-"tained upon the cable; should, however, the strain exerted by "the cable itself overcome that of the weights, then the roller or "shaft is drawn so far towards the fulcrum that the leverage "exerted by the tension of the cable becomes gradually diminished, "thereby gradually releasing the breaks until they are altogether "freed from the break shaft." Springs may be substituted for weights.

The Drawings show an eccentric on the roller or shaft, instead of a pulley, to which eccentric the weighted rope is fastened.

[Printed, 6d.]

A.D. 1858, March 29.—N° 667.

JACQUIN, EDMOND AUGUSTE (*a communication from Monsieur Henry Garnier*).—"An improvement in preparing plates for "printing."

According to this invention printing plates are prepared "so as "to give them the property of yielding a considerably greater

"number of impressions than they are capable of doing in their "ordinary or natural state."

The invention consists in covering the printing surfaces "with "a very thin and uniform coating of iron by means of electro-"metallurgical processes."

The electro-metallic solution of iron used is made by electrolysing a solution of sal-ammoniac for a certain time with a large iron anode. "If, on immersing the copper plate in the solution, "it be not immediately coated with a bright coating of iron all "over, the bath is not in a proper condition, and the copper plate "is to be removed and the iron plate attached and returned into "the solution." "A copper plate should not be allowed to "remain in the bath and attached to the negative pole of the "battery after the bright coating of iron begins to show a blackish "appearance at the edges." When taken from the bath, the copper plate is to be washed with water, dried, and then washed with turpentine; it is then ready for being printed from.

When the iron coating is worn, it may be removed by means of a suitable solution; the plate may then be re-covered, and this wearing and re-covering may be continued for "almost an in-"definite number of" times.

[Printed, 4*d*.]

A.D. 1858, April 6.—N° 734.

ERCKMANN, Jules.—(*Provisional Protection only.*) "Im-"provements in galvanic batteries."

The inventor states:—

"I apply to the metallic elements of a battery a motion whereby "each pair of plates are alternately fully immersed, and then for "the most part withdrawn from the liquids of the battery and "exposed to the air.

"This I effect by any suitable mechanism, and at the same time "while so imparting motion to the plates of the battery, I also "apply brushes of reed, horsehair, or other suitable material, "whereby the surfaces of the plates are cleansed of any deposits "that may be left thereon in the battery. The rising and lower-"ing motion to plunge and remove the plates into and from the "liquids of the battery also serve for scrubbing them against the "brushes, or a separate additional motion may be communicated "to the brushes; thus clear surfaces of metal are at all times

"presented to the action of the liquid of the battery, whereby "powerful currents of electricity are at all times generated. Such "currents can be used for transmitting intelligence through wires "uninsulated, or through the earth or water, as also for pro- "ducing the electric light or motive power."

[Printed, 3d.]

A.D. 1858, April 7.—N° 747.

BAKER, George Williams.—"Improved signal apparatus to "be applied to railways."

The object of this invention "is to indicate to the engine driver "or guard of a passing train at given points along a line of rail- "way whether the line is clear for a given distance ahead of the "train, or whether there is a train in advance within a prescribed "distance." This the inventor effects "by erecting at suitable "points along the line, say at three miles apart, more or less, "signal apparatus provided with semaphore or other signals, "which are to be worked by the combined use of a descending "weight and an electro-magnet."

The semaphore signal apparatus described in the Specification and shown in the Drawings has its vertical shaft worked by the descent of a weight that is released by the passing train. At the same time that the spring lever of the near apparatus is released, and the "danger" signal exposed, electric contact is momentarily broken with an electro-magnetic apparatus at the signal post previously past; the effect of this is that a stop-lever is removed from the mechanical arrangement of the said previous post, and suffers its signal shaft to display the "all clear" signal, by enabling it to revolve one quarter of a revolution. When the descending weight of the first-mentioned signal is released, its shaft is prevented from revolving more than a quarter of a revolution by the action of the electro-magnet's stop-lever, the electric current being always permitted to circulate excepting during the momentary release of the spring lever; for the same reason the activity of the electro-magnet prevents the shaft of the previously passed signal from revolving more than a quarter of a revolution.

The object of this invention may be effected by making instead of breaking the circuit; but in this case a different arrangement of parts to that above described must be used.

The inventor also proposes to avail himself "of the stop lever" that rests against the above-mentioned "spring lever" "to strike "a bell carried by the passing engine or train, for the purpose "of warning the driver of danger during foggy weather."

[Printed, 10*d.*]

A.D. 1858, April 10.—N° 782.

ROWETT, WILLIAM.—"Improvements in the construction of "electric telegraph cables or ropes."

This invention "principally consists in a method of con- "structing, preserving from decay, and regulating the specific "gravity of electric telegraph cables or ropes, so that they shall "possess a semi-floating quality." The inventor proposes to effect this "by constructing such said cables or ropes of Indian- "grass fibre, New Zealand hemp, Manilla hemp, European and "American hemp and flax, also cotton-wool, coir fibre, cocoa-nut "fibre, and other similar fibrous materials which have not here- "tofore been used or employed either entirely or principally in "the construction of electric telegraph cables or ropes." The inventor also proposes "to use, in combination with any or all of "the above-mentioned fibrous materials, a solution composed of "the following ingredients, matters, or substances, namely, tur- "pentine, rosin, paint, clean or coal tar, oil, naptha, water, cop- "peras, arsenic, aloes, bitumen, alum, bichloride of mercury, "gambier, india-rubber, shellac, copper-soap, or other metallic "soap and brimstone mixed and incorporated together," "or any "one or more of the said ingredients, either separately or in com- "bination, according to the climate of the country, the depth of "water, and description of ground in which the cable is to be "laid."

[Printed, 4*d.*]

A.D. 1858, April 10.—N° 785.

THIBAULT, AMABLE CYPRIEN.—"Improvements in the manu- "facture of paper-hangings, and in the machinery employed "therein." According to one portion of the invention, electro- casts are used to print the pattern on the paper.

This invention "consists of, 1st, a new process of imitating "wood on paper-hangings, oil cloths, and other fabrics or mate-

" rials; 2nd, of a sliding printing machine for the manufacture " of the printed papers, which machine is also applicable for " printing from surfaces in relief, or of a reverse character."

Prepared thin sheets of wood are mounted on a marble slab; these sheets of veneer " serve mmediately as the impressing sur- " faces; the veins and the pores of the wood, by the pressure of " plates, reproduce themselves on the paper or the fabric receiving " the impression. For wood too tender to resist the pressure of " the carriage after cutting it into veneers," casts thereof are taken " by means of galvanoplasty, or by the aid of any other known " process." These copper or other casts are made use of as the printing surfaces, " which are exact counterparts of the wood." The said casts can be further ornamented " by engraving, so as to " produce imitations of panels or ornaments."

The above-mentioned application of electro-metallurgy to the manufacture of paper hangings is not alluded to in the Provisional Specification.

A detailed description of the printing machine is given.

[Printed, 1s. 4d.]

A.D. 1858, April 13.—N° 800.

NEWTON, William Edward (*a communication*).—" Improved " means for operating railway brakes."

" This invention relates to a method of applying railway brakes " by means of electro-magnets, and attaching the same to the " carriages whereby the power of the magnets is applied in the " most direct manner; the mechanism employed is rendered very " simple, and facility is afforded for graduating the pressure of " the brakes upon the wheels. Electro-magnets are adapted to " the brake bars by means of links and screw bolts, so as to " admit of adjustment when required. The electro-magnets are " supported in a horizontal position by means of pendent springs " or arms, which will allow them to move a sufficient distance in " a horizontal direction to bring the brakes against the peripheries " of the wheels. The electro-magnets are connected by means of " suitable wires with a battery, and when the circuit is closed, " they will be attracted towards each other, and will then draw " up the brakes against the wheels, and retard the carriages."

[Printed, 5d.]

A.D. 1858, April 14.—N° 805.

MENNONS, Marc Antoine François (*a communication*).—
" Certain improvements in voltaic batteries."

This invention " consists in the application of lead to the con-
" struction of voltaic batteries in substitution of the zinc or
" other oxidable metal employed in the arrangements at present
" known.

" In taking for instance the apparatus known as ' Bunsen's bat-
" ' tery,' the zinc element is replaced by a cylinder of lead sur-
" rounding the carbon, which is placed in a porous vessel charged
" with pure or diluted acid. The outer vessel containing the
" lead is charged with pure or acidulated water, and the connec-
" tions are made by clefts or binding screws in the ordinary way.
" The metallic solution formed in the outer vessel during the
" action of the battery is drawn off when sufficiently saturated, to
" be afterwards treated by known processes for the production of
" carbonates, nitrates, chromates, and other compounds of lead.
" In many cases waste alloys of lead may be economically sub-
" stituted for the pure metal, but as a general rule the latter is
" found most advantageous."

The working cost of the voltaic current from the above-described battery is said to be " more than counterbalanced by the com-
" mercial value of the products of its action."

[Printed, 3*d*.]

A.D. 1858, April 16.—N° 826.

BROWN, George Gibson.—" Improvements in ships' bin-
" nacles."

" In place of fixing the binnacle to the deck " it is suspended
" by gimbles in a standard fixed to the deck, so that the binnacle
" itself always maintains a nearly vertical position, and the lamps
" for lighting the binnacles are placed under in place of over the
" card. The light from the lamps passes upwards through the
" bottom of the box containing the compass, which is formed of
" fluted glass in order to disperse the light, so that a uniform
" illumination may be obtained. The compass card is formed of
" talc or other suitable material, and is suspended within its box
" or case by gimbles in the ordinary manner; but in place of the
" point for supporting the needle being fixed in a metal bowl, as

" heretofore, it is carried by a band of metal sufficiently narrow " not materially to obscure the light. By arranging the binnacle " in this manner, the lamps are maintained constantly in a ver- " tical or nearly vertical position, and have much less tendency to " smoke the parts of the binnacle which are near them, and even " should the glass at the bottom of the compass box or case " become slightly smoked, it would not interfere with the obser- " vation of the instrument."

[Printed, *6d.*]

A.D. 1858, April 16.—N° 831.

JOHNSON, JOHN HENRY (*a communication from John McElheran*).—" Improvements in preparing printing surfaces."

1st. " Certain improved systems or modes of producing and " preparing picture types or other raised surfaces to be printed " from for the reproduction of landscapes, or other drawings or " designs." " The design to be reproduced is made in outline " upon paper or other suitable transparent material, which should " then be fastened to a plate of glass previously coated with wax " on the opposite side to that on which the design is attached." The design is traced through the wax by means of suitable gravers, and additional coats of wax are applied over the high lights. When engraved, the plate is ready for electrotyping direct, or when a drawing is required in white lines on a black ground, a cast is taken from the wax engraving, and an electrotype is taken from the cast. Ambrotypes (pictures etched in glass), and camera obscura pictures may be copied by the above-described process. To produce granulated effects, ground glass or sand of various degrees of fineness is sifted over the varnished plaster cast, and an electrotype or stereotype is taken from this and printed from.

2nd. The preparation of typographical printing surfaces by means of letter dies and suitable machinery. " In this case a " plaster cast is to be taken previous to the stereotyping or " electrotyping."

[Printed, *7d.*]

A.D. 1858, April 21.—N° 870.

ADKINS, JOHN, and BUSS, THOMAS ODEMCY LEBERT.— " Certain improvements in ships' compasses."

1st. "An improved mode of constructing the ship's compass, "so as to counteract the vibration to which they are subject in "rough weather, or from other causes." The needle is mounted on an axis in its bowl or case, the upper pivot being an agate cup in the glass cover, the lower pivot a steel point which enters a heavy cup on the axis. The bowl is divided into two compartments, the lower one of which is filled with alcohol, and the needle axis carries a hollow ball, whose specific gravity is so small that it supports the axis, needle, and compass card in the liquid quite independent of the lower centre; the needle is at the lower extremity of the axis in the liquid. In the case of loss of fluid from the bowl or injury to the ball, the instrument will act as an ordinary compass.

2nd. An annular ring is fixed round the inside of the compass bowl, the said ring having the degrees or points of the compass engraved in reverse, and the magnetic needle carries a card with only the north and south poles shown, and marked over the north pole "ship's head." In steering, the point marked "ship's "head," is kept to the point of the compass, as marked on the annular ring, to which it is required to steer.

[Printed, 6d.]

A.D. 1858, April 22.—N° 883.

CHATTERTON, JOHN.—"Improvements in combining and "coating insulated metal conductors for electric telegraphs."

"When combining two or more insulated wires," "such insu-"lated wires or metal conductors are caused to be laid together "by ordinary laying machinery, and as the combined or laid "insulated wires or metal conductors pass from the laying "machine they are caused to enter a vessel containing a com-"position of insulating materials kept heated, by which means "the combined product from the laying machinery is coated, and "then the same is caused to pass through an ordinary covering "apparatus, by which a coating of gutta percha, or a compound "containing gutta percha, is applied, the several processes above "mentioned being performed simultaneously." A previously insulated conductor may be passed through a composition of insulating materials into the laying machinery, it may then have the other insulated conductors laid round it, "or in this manner

"a core of other matter may be introduced." In like manner an insulated wire conductor may "be laid round with a series of "strands, yarns, or cords of fibrous or other materials by laying "machinery, and be then coated with gutta percha, or a com-"pound containing gutta percha, at one operation."

It is preferred to insulate the conductors in the manner described in the inventor's Specification, N° 252 (A.D. 1858).

[Printed, 3d.]

A.D. 1858, April 22.—N° 884.

GILMOUR, George.—"A telegraph cable or rope shackle."

This invention "may be used as a means of saving a submarine "telegraph in case of its being ruptured while being laid in the "sea; or such invention may be employed to save an anchor in "case its cable should part, or it may be employed for other "useful purposes."

When in use, the shackle is to be suspended in the sea by a rope from a buoy and connected by a rope with the stern of the vessel which is engaged in laying the cable; the buoy is also connected by a rope with the vessel. With this arrangement, and with the jaws of the shackle held back by the catches, while the vessel moves through the water, it drags the buoy and the shackle after it, and causes the latter "to slip or run on the cable." "The "tripping line of the catches of the shackle" being made to extend to the vessel, the apparatus is in a condition to save the cable should the latter break anywhere between the shackle and the vessel.

The shackle contains a roller and a pair of jaws; on pulling a cord connected with spring catches the jaws are released and are able to firmly grasp the cable against the roller; the cable is thus connected with the buoy.

A "wing" and a knife may be applied to the shackle; the "wing" serves as a rudder, and the knife cuts any sea-weed "which might run down on the line connecting the shackle with "a vessel."

[Printed, 8d.]

A.D. 1858, April 22.—N° 892.

PADDON, John Birch.—"An improvement in gas regulators."
In this invention magnetic force is employed.

This invention "consists in imparting to the weight or valve" of gas regulators "a constant attraction, in order that imme-"diately on the pressure inside the case of the regulator being "diminished, the valve shall be drawn from its seat with cer-"tainty, and open the inlet passage." For this purpose the valve is formed "of tempered steel converted into a magnet, as is well "understood;" a case of soft iron is combined with it; other methods of imparting magnetic attraction to the valve, or of opening the inlet passage by magnetic influence, may be used.

The Drawings show a regulator with a magnetized valve supported by a leather diaphragm; the socket, into which the bottom of the inlet pipe is made to screw, is composed of soft iron and exerts a constant attraction upon the valve.

[Printed, 5d.]

A.D. 1858, April 27.—N° 938.

HUGHES, David Edward.—"Improvements in the means of "and apparatus for transmitting signals and electric currents."

1st. Improvements on the apparatus set forth in the Specification N° 2058 (A.D. 1855). In the apparatus described in the said Specification "for transmitting printed messages simultane-"ously from opposite points through the same line wire," the circuit for the currents was closed by means of a helical line of pins suitably disposed upon a rotating barrel; instead of the barrel circuit breaker the present invention consists in using a rotating arm that travels over "a ring of pins" connected to the finger keys. Each pin is connected to its particular finger key, and is free to rise (as its key is depressed) and to come into contact with the rotating arm, thereby completing the electric circuit and enabling the letter to be impressed on the paper.

"In order to correct any irregularity that may have occurred "between the transmitting and receiving apparatus as respects "their printing action, I mount the type wheel loosely on its "shaft and drive it by friction of contact, which will permit of "its easy adjustment. On an escapement arbor driven by the "clockwork I mount a segment having one tooth, which takes "into a ring of cavities formed on the type wheel, and corre-"sponding in number with the spaces between the types; as, "therefore, each successive type is brought round to give an

" impression, the segment tooth engages with a cavity presented " to it and ensures the proper adjustment of the type wheel on " its shaft, giving it a set backward or forward when re- " quired."

2nd. " Certain improved means of transmitting electric " currents to distant stations," whether in connection with the inventor's improved printing instruments or with other electrical apparatus, " the chief object being to expedite the transmission of " a succession of electric currents over one and the same line " wire."

In the apparatus described in the Specification and shown in the Drawings, it is observable that the paper is passed forward " after the impress of every letter," and that the speed of the clockwork is regulated by means of an anchor escapement instead of a pendulum; also "the correct printing of the transmitted " message simultaneously on both instruments will not depend so " much on the synchronous action of the clockwork as on the " attention of the operators to lock their type wheel shaft, when it " is not required to be in action."

The rotating arm traversing a ring of pins, and the constant adjustment of the type wheel by the single-toothed segment, mentioned in the 1st portion of this invention, are described in detail in the 2nd part.

In order to facilitate "the simultaneous transmission of messages " in opposite directions by the use of one main line only" "it is " necessary that the current from the home battery in passing " through the helix of the home magnet shall have no effect upon " the home instrument." This is effected by using a coiled permanent magnet; the two coils of the permanent magnet are arranged " so that while one is in connection with the line the " other is in a shorter circuit, of which a tube of water forms a " part."

Another improvement which the inventor proposes to effect " in the transmission of signals is to have a constant current from " a voltaic battery in lieu of an intermittent current on the line, " and to obtain the required electric effects by neutralizing the " battery by a current sent from magneto-induction coils. Thus, " instead of the circuit being closed or broken to charge or dis- " charge the electricity, the current will be neutralized by a

" current of reverse direction when a signal is required to be
" transmitted."

[Printed, 8s. 11d.]

A.D. 1858, May 3.—N° 986.

APPOLD, John George.—" Improved apparatus for laying " submarine telegraphic cables."

This invention " relates to a novel arrangement or construction " of self-acting or self-relieving break." The strain on the cable, while being payed out, is maintained uniform " by adapting to " the shafts of the paying-out pullies a drum, on the surface of " which, an uniform friction is maintained by means of binding " bands or straps which are connected with a weighted vibrating " or moveable lever." The said lever is capable of being weighted to any extent. " The weights or pressure acting on the " vibrating lever or other convenient part of the break, have a " tendency to draw the friction strap or band tight on the rotating " drum, while the rotation of the drum has a constant tendency " to lift the weight, and, by loosening the strap or band on the " drum to relieve the break from the pressure to which it is " subjected."

The Drawings show the ends of the bands connected to levers that are mounted so as to vibrate upon centres eccentric to the centres of the band wheels.

In the dynamometrical apparatus, springs are employed instead of weights. A moveable pulley, over which the cable passes, is mounted on a block that works up and down in vertical guides; as the block is supported in the guides by coiled springs, the position of the block varies as the tension on the rope varies.

In the paying-out apparatus springs may be used instead of weights.

[Printed, 10d.]

A.D. 1858, May 5.—N° 1002.

HUGHES, David Edward.—" Improvements in the means of " and apparatus for transmitting signals and electric currents."

1st. An improvement on the telegraphic apparatus set forth in Specification N° 938 (A.D. 1858). To remove the liability of the operations of telegraphic apparatus being suspended, a pedal arrangement is provided for winding up the barrel of the clock-

work, "using for that purpose a rod which will pull forward a "click that is kept in contact with the teeth of the ratchet wheel "on the barrel."

2nd. A means of working electric telegraphs with feeble currents. A feeble line-wire current is made to act upon the helix of a suitably made galvanometer; the deflection of the needle completes a local circuit, which again restores the needle to its normal position by means of an electro-magnet in the local circuit. An electro-magnet and armature may be used in the line-wire circuit instead of a galvanometer helix and needle.

3rd. Utilizing the positive and negative currents (which are required to be transmitted through the cable in succession) to work telegraphic instruments. A circuit breaker is used which reverses the direction in which the alternate currents enter the coil of the relay or signal electro-magnet, and which is worked by a cog wheel in the train that moves half a revolution for every letter printed or signal transmitted, "so that the positive and "negative currents may be brought into the same polarity." The circuit breaker consists of a lever in connection with the line wire which alternately displaces springs (in connection with the ends of the coils of the electro-magnet respectively) from the earth wire.

[Printed, 1*s*. 7*d*.]

A.D. 1858, May 14.—N° 1090.

MACINTOSH, JOHN.—"Improvements in insulating telegra-"phic wires."

A yarn made from gun-cotton is lapped round the wire to be insulated; the coated wire is then subjected to the action of a fluid which acts as a solvent to the gun-cotton, "so as to cause it "to adhere firmly to the wire." A solution of gun-cotton may be dissolved in the solvent before using it. A coating of collodion may also be given to the naked wire by passing it through a thick hot solution of gun-cotton. Several coats of collodion may thus be given. India-rubber and other substances may be added to the solution. Over this coating a coating of India-rubber, or of India-rubber mixed with fibrous materials, may be applied, and, finally, the coated wire may be submitted to the action of sulphuric acid, or of chloride of sulphur and a solvent, "by which the coating "will be so changed as to be no longer liable to be injured by "tropical heat or like temperatures."

The apparatus used to apply the coating of India-rubber to the wire "consists of two rollers mounted on parallel axes, and re-
" volving in contact with each other; each of these rollers is
" grooved on its periphery, and the grooves on the two rollers
" meet to form an eye of the size of the covering desired;"
" against the rollers are placed hoppers in which the india-rubber
" is placed in the state in which it comes from the masticator; the
" india-rubber enters and fills up the grooves of the two rollers,
" and where the rollers come together, the india-rubber in the
" grooves is brought together, so as to form one piece enclosing
" the conducting wire." A second pair of rollers may be placed in advance of the first pair "to put on a second covering in a
" similar manner."

In this Specification a Specification dated "August 24th, 1857," and N° 2707 (A.D. 1857), are referred to.

[Printed, 4d.]

A.D. 1858, May 17.—N° 1099.

HARRISON, Charles Weightman. — "Improvements in
" obtaining light by electricity," which relate "to the use of
" mercury, or other fluid or semi-fluid body as one or more of the
" electrodes in obtaining light by electricity."

1st. The employment, within the lamp, of a burner formed of lamp black and silica, and feeding the said burner "with a sup-
" ply of the fluid electrode, so that it shall remain full or nearly
" so during waste or consumption by the light."

2nd. "Controlling or regulating the supply of fluid electrodes by
" means of a tap or other like agent, worked by electric action."

3rd. Increasing the magnitude of the centre of light by dividing the stream from the upper electrode, "so that a number of
" separate lights may be produced from it." It is preferred that the upper electrode be connected with the negative battery pole and the lower electrode with the positive pole.

4th. A self-acting means of maintaining the distance between the electrodes. This is accomplished "by connecting or suspend-
" ing the reservoir of the second electrode to a float which is
" placed on the first electrode contained in another reservoir,
" from whence the stream issues, whereby as the float descends,
" the second reservoir is advanced in exact proportion to the
" length which the stream is diminished by reduced pressure;"

the same object may also be effected "by causing by any suitable "arrangement the waste or condensed mercury, or other fluid "forming a descending stream electrode, to elevate the lower "electrode or reservoir; this may be conveniently done by placing "it on a float, under which such waste fluid is allowed to collect."

5th. "Forming the reservoirs for holding fluid electrodes of a "combination of lamp black, or other form of carbon and silica, "or of lamp black and china clay, rottenstone, or other highly "infusible material."

6th. "Preventing the condensation of vapors upon the glass or "case of electric lamps, by means of a stream of water, or other "liquid or air, being made by any convenient arrangement to "flow over or upon the interior surface of the glass or case, also "by partly or wholly filling the glass or case with water, alcohol, "bisulphuret of carbon, or other suitable liquid, and in causing it "to circulate around the light, or to pass away through appa-"ratus by which it may be filtered and then returned to the "lamp again by a pump or other means, which may be worked "by electric action."

7th. "Preventing the rise of vapours from the waste fluid of "electrodes by the introduction of a stratum of water or other "liquid into the waste pipe or reservoir."

The Specification describes and the Drawings show two lamps, one having both electrodes of mercury, the other a carbon lower electrode and mercurial upper electrode.

The Specification N° 588 (A.D. 1857) is referred to in this Complete Specification.

[Printed, 10*d.*]

A.D. 1858, May 19.—N° 1121.

HENRY, Michael (*a communication*).—(*Provisional Protection only.*) "Improved apparatus for communicating or trans-"mitting, or producing facsimile copies of despatches, intelligence, "or messages, or characters, drawings, or devices."

"The object of this invention is to communicate, transmit, or "produce in facsimile copy, written messages or despatches, "words, signs, characters, plans, or drawings, or devices, by the "agency of currents; and this is effected by a manipulator or "transmitter, and a 'receptor,' the manipulator consisting of a "shaft having alternating motion with a bar resting on it, which,

"at every motion of the shaft is separated from it (preferably by "a stud on a wheel), and is fitted with a pipe or stylus in direct "communication with the battery, and moving on a plate on "which the despatch has been written in non-conducting ink. "The receptor, set in motion similarly to the manipulator, is pro-"vided with an electro-magnet acting on a moveable piece or "lamina, which is attracted each time a magnetic current passes. "This lamina has or ends in a pen or pencil, which traces the "characters, &c. transmitted on common paper. As soon as the "manipulator stylus begins to move on the plate, a magnetic "current is established, and the electro-magnet allows the lamina "to fall with its point on the paper and mark on it. Any paper "may be used without previous preparation or damping."

[Printed, 3d.]

A.D. 1858, May 22.—N° 1152.

BAGGS, Isham.—"Improvements in electric telegraphs and in "the apparatus employed therein and therewith, parts of which "are applicable to other electrical purposes."

1st. The use and application, at receiving stations, "of an "electric reservoir or reservoirs capable of accumulating the "electric power, or of rendering the effects which it may be "intended to produce more decisive or concentrated in their "character." Coated surfaces, coils, and, generally, the principle of induction is employed as the means of accumulation.

2nd. "To exalt the intensity of the induced electricity from a "coil" it is caused "to accumulate in condensers, or their "electrical analogues arranged as a series of Leyden jars."

3rd. The employment of machinery to make and break electric contact "in developing the successive electrical impulses" of a coil.

4th. Using electric force to record telegraphic communications by the deflection of flame, gases, vapours, or light bodies through stencilled plates upon substances fit to receive the impressions.

5th. "Causing telegraphic communications from two or more "instruments to pass simultaneously through the same wire "without interference, by the employment of electricities differing "in quantity and intensity from each other, so as to be only "capable of acting each one respectively upon a different class of "instrument at the receiving station or stations."

6th. The construction and use of a peculiar description of coil. A soft iron core is wound with primary and secondary coils, and these are surrounded with soft iron cylinders. In the construction of the coil the following order is observed:—Iron core, primary wire, secondary wire, primary wire; iron cylinder, primary wire, secondary wire, primary wire; iron cylinder, and so on. "The wire should properly be all wound the same way." The secondary wires are "connected as a single coil." The primary wires are "connected as one bundle of" wires; the "primary currents next the core flow in one direction" and the "other primary currents in the other direction."

"The same principle also applies to hard steel when used in the "development of magneto electricity."

[Printed, 7d.]

A.D. 1858, June 2.—N° 1239.

WHEATSTONE, Charles.—"Improvements in electric tele-"graphs, and in apparatus connected therewith," consisting of "mechanism for the purpose of transmitting through a tele-"graphic circuit messages previously prepared, and causing them "to be recorded or printed at a distant station."

Suitable currents for enabling the message to be received at the distant station are sent by means of a perforated strip of paper; corresponding marks are produced upon a ribbon of paper at the receiving station, by means of a printing or writing instrument.

Each part of this telegraphic system "has its independent "originality."

1st improvement.—"An instrument for perforating the slips "of paper." "The slip of paper passes through a guiding "groove, at the bottom of which an opening is made sufficiently "large to admit of the to-and-fro motion of the upper end of a "frame containing three punches, the extremities of which are in "the same transverse line. Each of these punches is capable of "being separately elevated by an appropriate finger key. By the "pressure of either finger key, besides the elevation of its corre-"sponding punch, in order to perforate the paper, two different "movements are successively effected; first, the raising of a clip "which holds the paper firmly in its place; and secondly, the "advancing motion of the frame containing the three punches, "by which the punch which is raised carries the ribbon of paper

" forward the proper distance. During the reaction of the key, " consequent on the removal of the pressure, the clip first fastens " the paper, and then the frame first falls back to its normal " position. The two external keys and punches are employed to " make the holes, which grouped together represent letters and " other characters, and the middle punch to make holes which " mark the intervals between the letters."

2nd improvement.—The transmitting instrument. The mechanism of this instrument is somewhat similar to that of the perforator, three wires taking the place of the three punches; an eccentric produces and regulates the requisite movements. By means of suitable contacts and insulations, while only one of the external wires is elevated, the current in the telegraphic circuit passes in one direction or the other according to the wire elevated; the current is interrupted while both wires are simultaneously elevated or depressed. Thus the external rows of holes in the slip of paper cause electric currents to enter the telegraphic circuit at intervals and in directions that enable the requisite marks or signals to be given at the receiving station. "The middle wire " only acts as a guide to the paper during the cessation of the " currents."

3rd improvement.—The recording apparatus. "The pens or " styles are depressed and elevated by their connection with the " moving parts of the electro-magnets; they are entirely inde- " pendent of each other in their action, and are so arranged that " when the current passes through the coils of the electro-magnets " in one direction one of the pens is depressed and when it " passes in the contrary direction, the other pen is depressed; " when the currents cease, light springs restore the pens to their " usual elevated positions." The pens mark the paper by passing through two capillary holes in the bottom of the ink reservoir; thus they carry with them sufficient ink to make a legible mark on the paper. "The motion of the paper ribbon is produced and " regulated by apparatus similar to those employed in other re- " gister or printing telegraphs."

The electro-magnets described as the 2nd improvement in N° 1241 (A.D. 1858), "are well adapted to effect the motions of " the pens of this instrument."

Small permanent magnets may be used to restore the position of the pens.

4th improvement.—"A translator." This instrument translates the telegraphic signs into the ordinary alphabetic characters. When the number of points in succession is limited to four, 30 characters are represented. "The instrument presents externally "nine finger stops, eight of which are arranged in two parallel "rows, four in each, and the remaining one is placed separately. "The principal part of the mechanism within is a wheel, on the "circumference of which 30 types are placed at equal distances "representing the letters of the alphabet and other characters; "other mechanism is so disposed and connected thereto, that "when the keys of the upper row are respectively depressed, the "wheel is caused to advance 1, 2, 4, or 8 steps or letters, and "when those of the lower row are, in like manner, depressed, the "wheel advances respectively 2, 4, 8, or 16 steps. By this dispo-"sition, when the stops are touched successively in the order in "which the points are printed on the paper, touching the first "stop for one point, the first and second for two points, &c., and "selecting the stops of the upper or lower row, according as the "point is in the upper or lower row of the printed ribbon, the "type wheel will be brought into the proper position for placing "the letter corresponding to the succession of points over a "ribbon of paper. The ninth stop, when it is pressed down, acts "to impress the type on the paper, to cause the advance of the "paper, in order to bring a fresh place beneath the type wheel, "and subsequently to restore the type wheel to its initial po-"sition."

5th improvement.—An arrangement to enable the pens of the recording apparatus "to go back to their normal positions when "the currents in the telegraphic circuit cease." "An extra coil "wire is wound round each of the electro-magnetic bars, which "act on one side of each of the double magnetic needles appro-"priated to the two pens. These coils are entirely insulated from "those connected with the telegraphic circuit," and form together a local circuit, traversed by a weak current from a voltaic apparatus; "by this current the needles are held when no current "exists in the telegraphic circuit constantly attracted towards "these electro-magnets. When, however, the current transmitted "through the telegraphic circuit acts on the coils, besides its "direct action, to cause the deflection of one of the double needles "and the detention of the other, it neutralizes the current of the

" local battery in that electro-magnet, where its effect for the time
" would be disadvantageous."

6th improvement.—" The application of ribbons of paper pre-
" pared by the perforator, and passed through the transmitter, as
" herein-before described, to produce the successive motions of a
" magnetic needle or needles corresponding to the signals re-
" quired, whether separately employed for this purpose, or in
" conjunction with the printing apparatus already mentioned."

[Printed, 2s. 10d.]

A.D. 1858, June 2.—N° 1241.

WHEATSTONE, CHARLES.—" Improvements in electro-mag-
" netic telegraphs and apparatus used for transmitting signs or
" indications to distant places by means of electricity."

In this Specification various improvements on electro-magnetic telegraphs are described which are constructed on the same general principles as those set forth in N° 8345 (Old Law), " and on other
" electro-magnetic instruments to which the same modifications
" are applicable."

The *first part* of the invention " relates to improvements in the
" signal instrument."

1st improvement.—" The construction of the mechanism which
" converts the oscillatory motion of a magnetic needle or bar or
" the armature of an electro-magnet into the rotary step-by-step
" motion of the hand." Two propelments are described and shown. In one method two pallets are mounted upon separate axes, their longer ends act on the inclined teeth of the propelling wheel at opposite points of its circumference and their shorter ends are connected by a hair spring; " a pin attached to the axis
" of the magnetic needle or bar, or to the armature of the electro-
" magnet, acts in its alternate motion on each pallet, and presses
" it firmly against a tooth of the wheel, while at the same time
" the hair spring presses the other pallet against the opposite
" tooth, but so lightly and yieldingly as to offer no sensible im-
" pediment to its motion." " In a second method, the axis of the
" propelling wheel, instead of being fixed, is attached to the end
" of a short lever, the other arm of which is acted upon by a pin
" connected with the magnetic needle or bar, or the armature of
" the electro-magnet," or the centre of motion of the lever may

be the centre of motion of the magnetic needle. The rotary motion of the wheel is occasioned by its motion towards two fixed pallets alternately. Spring tangential pallets are used; thus, although the teeth are efficiently propelled, the spring readily yields to a tooth passing beneath it. A driving pin connects the wheel axis with the axis of the hand or pointer.

2nd improvement.—" The construction of the electro-magnetic " arrangement employed to produce the motions of the step-by- " step index and dial telegraphs;" this arrangement " is equally " applicable to other forms of electro-magnetic telegraphs and " alarums. Two magnetic needles or bars with their poles in " opposite directions, are placed near each other on opposite sides " and parallel to the axis, round which they move; two straight " electro-magnets are placed one on each side of the axis of motion " of the needles, and parallel thereto; when a current is trans- " mitted through the coils of these electro-magnets in such " manner that the adjacent poles of each shall have at the same " time opposite polarities, the dissimilar poles of the two needles " are simultaneously acted upon, so that each of their poles is " attracted by one pole of one electro-magnet, and repelled by one " pole of the other electro-magnet, the attracting and repelling " actions all conspiring to move the axis in the same direction." Various modifications of this electro-magnetic arrangement are set forth in the Specification.

3rd improvement.—A modification of the 2nd improvement, which renders it capable of acting upon another circuit, so as to invert alternately a voltaic current interposed therein, " in order " to produce simultaneous and corresponding motions in another " similar apparatus forming part of a signal telegraph at a distant " station." For this purpose the axis of the magnetic needles is made in two parts, insulated from one another, and spring stops are provided, so that when the line-wire current passes round the electro-magnets in one direction the voltaic circuit is completed in a given direction, and when the said line-wire current passes in the opposite direction the voltaic circuit is completed in the opposite direction.

The *second part* of the invention relates to improvements in the communicator or transmitting instrument, " and to improvements " in magneto-electric and electro-magnetic machines employed in " conjunction therewith."

4th improvement.—"A new construction of the communicator "when a voltaic battery is employed." This instrument differs from that described in N° 8345 (Old Law), for it alternates the currents sent into the line-wire circuit, and its letter wheel consists of a number of flexible radii, with a finger pin at the extremity of each radius. To indicate a given letter, its radius is pressed down and the wheel is rotated until a prolongation of the finger pin comes into contact with a fixed stop; the proper number of currents for the indication of a given letter is by this means sent into the telegraphic circuit. To produce the alternation of the currents, a toothed wheel on the axis of the letter wheel rotates a pinion whose axis carries an insulated grooved disc with a pin projecting from it parallel to the pinion's axis. As the disc rotates, its pin raises one of two insulated spring bars alternately; the battery poles are respectively connected with the pinion's axis and with the insulated disc, and the above-mentioned spring bars are respectively connected to the terminals of the telegraphic circuit. When an induction apparatus is used with this communicator, the voltaic terminals are connected to the spring bars, and the coil's primary terminals are respectively connected to the pinion and its insulated disc; the terminals of the telegraphic circuit are permanently connected to the terminals of the secondary or induction coil.

5th improvement.—"The application of the letter circle described in the 4th improvement, in combination with a magneto-electric machine." The pinion mentioned in the 4th improvement is fixed on to the axis of the magneto-electric machine; the terminals of the coils being permanently and directly connected with the telegraphic circuit, the required number of shocks are transmitted to the receiving instrument.

6th improvement.—This improvement relates to "the arranging "communicators" "for transmitting into a telegraphic circuit, "currents or shocks produced by magneto-electric or electro-"magnetic machines in continuous action, in a suitable manner "to actuate a step-by-step receiving instrument included in the "telegraphic circuit, each such instrument consisting of a series "of finger keys, equal in number and corresponding with the "letters and signs on the dial of the step-by-step receiving in-"strument; these keys being so arranged that when acted on "they cause such a number of efficient currents or shocks to

"pass into the telegraphic circuit as is required to move the
"index or pointer of the receiving instrument from the position
"in which it last stopped to the letter or sign corresponding with
"the key acted on."

This improvement also relates to "the method of preventing "imperfect currents or shocks from passing into the telegraphic "circuit by so arranging such communicators" "that whatever "may be the position of the parts of the magneto-electric or "electro-magnetic machine, when a finger key is acted on, the "coils of the machine may not be put into electric communica-"tion with the telegraphic line until the parts of the machine are "in a proper position for communicating an efficient shock or "current."

This improvement also relates to "the so connecting together "the finger keys that the depression of or the acting on any one "of them, may restore to its original position the key last "operated on."

In one machine made according to this improvement, described in the Specification and shown in the Drawings, the depression of a finger key causes the requisite number of currents to pass into the telegraphic circuit during the time the said finger key is depressed. The armature axis is only geared to the index axis upon the depression of a finger key; this action disconnects a short circuit, allows the currents to pass into the telegraphic line, and projects forward a lever, which is struck by a spring catch on the index axis, when the said catch is brought opposite to the said lever by the revolution of the axis; the lever is thus restored to its normal position and sets free the previously depressed key. On the release of the key the currents again circulate in a short circuit, and the index axis is thrown out of gear with the armature axis. To prevent imperfect currents being thrown into the telegraphic circuit, the index axis is only thrown into gear with the armature axis when the inversion of the current takes place.

In a second machine made according to this improvement described in the Specification and shown in the Drawings, the depression of a finger key arrests the motion of an arm, and thus prevents (during the depression of the said finger key) the transmission of the currents which were before circulating in the telegraphic circuit. The arm is fixed to the index axis and the armature axis carries a toothed wheel which is usually in electric

contact (by means of one of its teeth) with the said arm, the depression of the finger key causes the contact to be broken, the arm slipping by the teeth when the armature is in such a position that no current is induced in its coils; this peculiarity of the contact of the tooth with the arm prevents imperfect currents from entering the telegraphic circuit. To restore the finger key last operated upon to its original position when another finger key is depressed, a chain is placed round a series of friction rollers concentric with the finger keys; when a finger key is depressed, it takes up the slack of the chain by means of a lever and releases the key previously depressed by pulling the chain tight at that place.

7th improvement.—The armature of a magneto-electric machine is caused alternately to approach to and recede from the poles of a magnet or magnets. A wave-line wheel, by its rotation, acts upon the upper end of the lever that carries the armatures; the wave-line wheel "has fifteen rises and falls," hence thirty currents are sent into the telegraphic circuit by one revolution of the wheel.

8th improvement.—"A construction of the magneto-electric "machine, in which neither the magnet nor the coil of wire is "put into motion, but only the soft iron core which is enveloped "by the wire." The opposite ends of the soft iron core have lateral prolongations of equal length and at equal angular distances from each other; the said prolongations extend over the ends of the coil so as to be in close proximity to the poles of a magnet or circle of magnets, the prolongations at opposite ends of the coil being opposed to opposite magnetic polarities. "On "causing the core to rotate once, as many double currents are "produced in the coil as there are prolongations on each end of "the soft iron cylinder." A modification of this arrangement consists in fixing coiled cores on each of the extremities of the magnets, the coils being coupled together so as to deliver the induced currents into a single circuit; the armatures (one to each magnet) are fixed to a central axis and are carried before the poles of the coiled cores in succession.

9th improvement.—"Combining or gearing together a number "of magneto-electric machines," "so that the armatures of all "of them shall revolve at the same speed and occupy at all times "the same angular positions with respect to their magnets."

The wires of the coils are so connected as to deliver all the currents into a single circuit.

The *third part* of the invention "relates to improvements in "electro-magnetic alarums, clocks, and registers or counters."

10th improvement.—"The application of the electro-magnetic "arrangements" described under the 2nd improvement "to the "withdrawal of detents for the purpose of permitting alarums to "sound." By means of a short arm on the axis of the electro-magnetic arrangement, which short arm carries pins, a set of levers is liberated and the clockwork allowed to act.

11th improvement.—"The application of mechanism to electro-"magnetic alarums to prevent the detent from escaping until "several currents or shocks have been sent through the circuit." The electro-magnetic apparatus, by its deflections, actuates a kind of escapement, as described under the head of the 10th improvement; the lever worked by the short arm and pins has three teeth formed at its end, and all the teeth must be liberated (by successive deflections) before the lever can be set free in order to set free the other levers in series, and thus liberate the clock-work.

12th improvement.—"Mechanism for retaining the hammer "of electro-magnetic alarums." A pin in the periphery of the hammer wheel acts on a catch which limits the vibrations of the hammer when the motion of the hammer wheel is arrested; on the next liberation of the clockwork, the motion of the hammer wheel immediately liberates the hammer "and allows the alarum "to sound freely."

13th improvement.—"The application of the 1st and 2nd "improvements above specified to the construction of electro-"magnetic telegraphic or sympathetic clocks." The pallet wheel has thirty teeth and actuates the ordinary clock train.

14th improvement.—The application of the 1st and 2nd improvements to telegraphic registers or counters. This application differs from the 13th improvement only in the proportion of the train wheels and in the divisions of the dials.

15th improvement.—The application of magneto-electricity to work registers or counters. The armature axis is suitably attached to the machine, the motions of which are to be registered.

[Printed, 4s. 6d.]

A.D. 1858, June 3.—N° 1255.

LIEBIG, JUSTUS BARON VON.—" Improvements in protecting " the silvered surface of mirrors and other articles of glass."

This invention " consists in protecting the silvered surface of " mirrors and other articles of glass, by depositing thereon a " coating of copper or gold or other metal by the agency of elec- " tricity, combined with the use of a neutral solution of the " double salt tartrate of oxide of copper and soda (potash or " ammonia), or an alkaline solution of gold, nickel, or other " metals."

The alkaline gold solution consists of caustic soda added to the double chloride of gold and sodium.

" The alkaline solution of nickel is prepared by adding a slight " excess of ammonia to a solution of one part of sulphate of " nickel in (40) forty parts of water."

[Printed, 4*d.*]

A.D. 1858, June 5.—N° 1268.

HANCOCK, CHARLES.—" Improvements in the manufacture " of electric telegraph cables."

This invention " consists in the protecting the insulated wire or " wires of submarine or other telegraph cables by encircling or " encasing the same in a rope or other covering manufactured " from animal hair, generally giving the preference to horsehair. " This rope or covering may be made either by twisting or " braiding, or by any of the means ordinarily adopted in the " manufacture of such or similar ropes or coverings. The principal " advantages resulting from the use of hair for this purpose arise " from its peculiar properties of being impervious to water, " secure from the ravages of the worm, free from the rust and " decay incidental to metal wires, very light in weight, and its " great strength and toughness."

[Printed, 3*d.*]

A.D. 1858, June 8.—N° 1289.

BROOMAN, RICHARD ARCHIBALD (*a communication from Messieurs Liébaut and Egrot*). — (*Provisional Protection only.*) " Improvements in the manufacture of copper pipes and tubes."

" This invention consists in manufacturing copper tubes and

"pipes without joint or weld, and either straight or curved, by "depositing copper in a galvanic battery over and upon a core "of lead, or other fusible metal or material capable of being fused "or melted by heat, or otherwise reduced and removed. The "core may be solid or hollow, and when hollow may be allowed "to remain in the copper tube, or may be removed by melting, "or otherwise."

[Printed, 3d.]

A.D. 1858, June 8.—N° 1293.

IRONS, DAVID.—"Improvements in the mariners' compass."

"This invention consists in the so constructing a compass, that "its needle shall at all times point due north and south. For "this purpose the card of a compass is constructed with three "magnets or needles; one needle is of the ordinary kind, and "fixed on the card to point north and south, the other two mag- "nets are fixed to the card at right angles to the other needle or "magnet. The north end or pole of one of the two additional "magnets is outwards, and placed to the west of the north end "or pole of the first-mentioned magnet or needle. The third "magnet has its south pole outwards, and in position it corre- "sponds with the east point on the card."

Besides the above-described arrangement, other arrangements are shown in the Drawings. When a compass card is to be used on board of an iron vessel, four magnets are employed in addition to those named above; these supplemental magnets are mounted radially and at angles of 45° to the north and south line; on the northern half of the card all the north poles are outwards, and on the southern half of the card all the south poles are outwards. In one instance bent magnets are applied to the card, these have the chords of their curvature parallel to the east and west line. In another instance bent magnets are placed round the edge of the card. The bowl is preferred to be of cast iron and the binnacle may be lined with wrought iron.

[Printed, 1s. 3d.]

A.D. 1858, June 14.—N° 1341.

YOUNG, JAMES HADDEN.—"Improvements in setting up (com- "posing) and distributing types." Electro-magnetism is em- ployed to collect types at the exit of the composing machine.

In the composing machine described, a "step-wheel" of a peculiar construction is used to take the types off an inclined plane on which the different types are collected, as they are required, at one particular point. The wheel and inclined plane are prevented from being in absolute contact, and are in connection with the opposite poles of a galvanic battery which (when active) excites an electro-magnet. "When the type slides down "on the wheel, while it is partly resting on the inclined plane it "completes the galvanic circuit, and this again rendering the "iron magnetic, causes it to attract one end of a lever, the other "end serving to move the step-wheel one step, and thus each "type on its arrival on the wheel causes it to move as required. "Instead of using the types themselves as a conducting medium, "they may in sliding down by moving slight slips of metal cause "the necessary circuit to be completed."

The above-described improvements chiefly relate to the composing machine described in N° 8428 (Old Law).

A machine for distributing types is also described in the Specification and shown in the Drawings.

[Printed, 1s. 5d.]

A.D. 1858, June 15.—N° 1352.

JULIUS, BARON FERDINAND.—"An improved self-registering "compass or control compass."

A compass needle "carries a small funnel or basin in its centre, "from which a tube extends to one end; as, for example, the "north end of the needle. Round the circumference of a box "placed under the compass box are a series, as, for example, "sixty-four small chambers, with inclined bottoms and glass "doors, and marked according to the points and half points of "the compass. A revolving wheel driven by a watch or clock-"work, and provided with twelve or other suitable number of "cavities, receives a ball in each cavity and drops the ball at "intervals of five minutes or other regular intervals into the "basin on the magnetic needle. The ball runs through the tube "and falls into whichever compartment the tube happens to be "over at the time, and thus records the position of the needle "at that time." "The steered course is signified plainly by the "chambers in which the balls lie. If one, two, three, or more "balls are found in the same chamber, the same course has been

"made for 5, 10, 15, or more minutes. The balls are then taken "out at the glass doors and returned to an upper fixed tube "which supplies the wheel; this tube is large enough to allow "the balls to run down freely, but not to pass each other. By "numbering the balls, and putting them in the tube in regular "order, the numbers on the balls in each compartment will show "the particular times at which the vessel was proceeding in the "course indicated."

[Printed, 6*d*.]

A.D. 1858, June 18.—N° 1379.

NEWALL, Robert Stirling.—(*Provisional Protection only.*) The title of this invention is "Improvements in the manufacture "of cords, ropes, and cables."

The inventor states:—

"The nature of my invention is to lay yarns into a strand in "such a manner as to retain the twist given to them in the pro- "cess of spinning; then to lay a number of such strands into a "cord or rope without altering the twist in the strands; also to "lay yarns or strands without altering the twist round a core, "which may be of yarns, or it may be of insulated wire or wires, "so as to form a submarine electric cable."

[Printed, 3*d*.]

A.D. 1858, June 18.—N° 1381.

MARTIN, Pierre Blaise Emile.—"Improvements in ob- "taining electro motive power."

This invention "consists in obtaining motive power from the "expansion or dilitation produced by the combustion by means "of the electric spark of a mixture of combustible gas and air, "or by the combustion and decomposition by the electric spark "of combustible gas, air, and water vaporised."

The Drawings show a conical chamber into which regulated quantities of air, combustible gas, and water are admitted. The contents of the chamber are exploded at regular intervals, thus either reacting upon a fluid by means of "a supplementary vessel "or compartment" "closed by a valve," or working a piston and cylinder arrangement. If the combustion chamber contains water, it is converted into steam and assists the action. The

exploding spark is obtained by means of an nduction coil worked by a galvanic battery.

"The heated dilating gases may be applied to heat a steam "boiler, or the gases and vapour combined may be employed in "the same manner as ordinary steam to produce motion in "pistons, &c., or to produce motion by direct reaction upon "fluids, for propelling vessels or otherwise, or they may be used "for projecting projectiles, and for any other purposes to which "such sources of power are or may be applicable."

[Printed, 6*d.*]

A.D. 1858, June 19.—N° 1385.

BRADSHAW, John.—(*Provisional Protection only.*) "Certain "improvements in apparatus for obtaining and producing motive "power" by electro-magnetism.

"Upon a vertical shaft or spindle a disc, rim, or wheel is secured "in a horizontal position, such wheel being provided with a "number of metallic bars permanently magnetized (or to satura- "tion) placed at certain intervals side by side, and radiating from "the centre of the wheel, the two 'poles' of each magnet being "placed alternate to that next in succession throughout the entire "circle. Around the periphery, and slightly above the circle of "magnetized bars a series of electro-magnetic coils or helices are "arranged, their magnets being connected in pairs, the conducting "wire passing from one coil to another, and forming a complete "electro-magnetic circuit. The magnets of the magnetic coils "project over the outer ends of the radial permanent magnets, and "according to the alternating direction of the electric current, or "the polarization of their extremities, both repel and attract the "poles of the permanent magnets alternately, and thus cause the "wheel or disc upon which they are mounted to rotate and give "motion to the vertical shaft, from which the power may be "transmitted by means of any suitable arrangement of gearing."

The power of the apparatus may be increased by fixing the permanent magnets in a vertical position and employing two circles of coils. The magnets and coils may be "employed in "rows or tiers upon the same shaft to increase the driving "power."

[Printed, 3*d.*]

A.D. 1858, June 21.—N° 1395.

BROOMAN, Richard Archibald (*a communication from Messieurs Légé and Pironnet*).—" Improvements in treating wood " to preserve and color it, and in apparatuses to be employed " therein." This invention is used for electric telegraph posts.

1st. Certain "methods or processes of treating wood for the " purposes of preserving and coloring it."

2nd. Certain apparatus employed in the treatment of wood.

3rd. " Treating telegraph posts and other pieces or lengths of " wood, by smoothing one of the ends of each, and placing upon " the smoothed end a ring of india-rubber, and against that a " disc or discs of wood or other material, so as to form a closed " chamber within the india-rubber ring, and by forcing a pre- " serving fluid into this chamber under great pressure, hydraulic " or other, until the said fluid is caused to penetrate and pass " through the timber, saturating the same. The discs are tem- " porarily secured to the ends of the posts by bolts or screws or " otherwise, and have a hole in the centre to admit the fluid. By " connecting a number of flexible tubes to one feed pipe, and " hydraulic or other apparatus, and leading each flexible tube to a " post, any number of posts may be treated simultaneously."

Sulphate of copper is mentioned as the preserving fluid; in this case the wood should not be used for about two months after treatment.

[Printed, 7*d.*]

A.D. 1858, June 22.—N° 1406.

SCHAUB, George.—" Improvements in the manufacture of " door plates, sign boards and other surfaces having inscriptions, " designs, or ornaments thereon, and in the manufacture of " detached letters, designs, and ornaments to be affixed to walls " and sign boards or used for other like purposes."

1st. " Making the said plates and other surfaces by electro- " deposition, either upon a compound matrix composed or built " up of separate or detached matrices, or upon a matrix obtained " by taking a mould or impression from a pattern plate or other " surface composed or built up of separate pieces, or made of " separate pieces attached to a plane surface."

2nd. " Manufacturing the said plates and other surfaces by " casting an easily fused metal or alloy, or plaster of Paris, or

" other cement upon the backs of the letters or ornaments placed " face downwards in the proper order upon a plane surface, " whether the said plate be defended with glass or left unde- " fended."

3rd. " Making the said letters, designs, and ornaments by " electro-deposition, the said deposition being effected on matrices, " portions of which are stopped out by varnish, gutta percha, or " other non-conductor of electricity, the said matrices being " obtained by electro-deposition from plates engraved with lines, " serving as guides in applying the varnish, or the said matrices " being produced by transferring designs to plates, the said " designs being obtained from lithographic stones or other " convenient printing surfaces."

4. Making the above-mentioned surfaces, &c. "by taking an " electro-deposit from a metal plate on which a design printed " from any convenient surface has been transferred, the deposition " being continued until the reduced copper or other metal has " spread over and covered the lines of the transfer, and thus pro- " duced a continuous plate having a sunken design thereon."

[Printed, 8*d*.]

A.D. 1858, June 26.—N° 1449.

PREECE, William Henry, and CLARK, Josiah Latimer. —" Improvements in electric telegraphs."

" The ends of the line wires are each, as heretofore, bound " round or fixed to an insulator fixed to a suitable terminal arm " on a post or upright; a leading-in wire coated with gutta " percha is attached to the end of each line wire, near where it is " fixed to the insulator, and such coated leading-in wire passes " up through a tubular insulator, which is fixed at its upper part " into a cast-iron or other suitable arm, which is hollow. The " coated leading-in wire having passed into the hollow arm from " the tubular insulator, is conducted down in a hollow in the " post or upright to which the arms are fixed; the hollows, " interior of the insulator, and the arm where the coated wire " passes, are filled up with cement." " The leading-in wires are " attached to the line wires by binding screws intermediate of " the tubular insulators and the line wires. It is preferred that " the tubular insulators through which the coated leading-in

"wires pass into the hollow arms should have an inverted insu-"lating cup surrounding the hollow or tubular central part."
[Printed, 8*d.*]

A.D. 1858, July 2.—N° 1483.

VASSEROT, Charles Frédéric (*a communication from Louis Barthelemy Suzanne Charrier de Sainneville*).—(*Provisional Protection only.*) The title of this invention is "An improved wire "conductor for electro-magnetic machines."

The invention "consists in using a cord made either of hemp, "cotton, wool, flax, horsehair, cloth, cane, or any other material "capable of being twisted, plaited, or rolled, and offering at "the same time resistance and suppleness, and in surrounding "the said cord with a wire of copper, or any other conducting "metal.

"This mode of conducting electricity presents a greater "economy than all the conductors hitherto known or used, and "it may be employed for electro-magnets of any size whatever."
[Printed, 3*d.*]

A.D. 1858, July 2.—N° 1491.

CLARK, Josiah Latimer.—"An improvement in electric tele-"graph cables or ropes."

"In order to distinguish one wire from another when coated "with gutta percha, or a compound containing gutta percha, or "with other plastic insulating matter, a projecting rib or ribs, or "it may be groove or grooves, are formed longitudinally on or in "the coating. By these means, when such coated wires are made "up into telegraph cables or ropes, the wires have each their "distinguishing marks. For a similar purpose elevations or "depressions may be formed at intervals in or on the surface of "the coating of gutta percha, or compound containing gutta "percha, or other plastic insulating matter."

Of the different systems of marks it is preferred to employ a rib or ribs "formed on the coating of plastic insulating material "with which the conducting wire is covered, and such ribs are "best produced during the covering operation;" for this purpose the covering die is notched "by means of a graving tool or other-"wise."

In order to produce projections at intervals on the surface of the covered wire, it is passed between rollers; one of the rollers is suitably engraved, the other is plain.

To produce indentations at intervals on the surface of the covered wire suitable rollers are employed, and, in this case, the wire is passed through the rollers when the coating has become nearly or quite hard.

[Printed, 5*d.*]

A.D. 1858, July 3.—N° 1499.

CHISHOLM, JOHN.—"A method of disinfecting and deodo-" rizing or treating sewage and other matters and structures and " places."

" This invention consists in the application of electric or " galvanic agency to the sewage or other matters, or to the " locality to be disinfected or deodorized, whereby foul gases are " decomposed, noxious air or matters purified, and in certain " cases the resulting products may be turned to useful account."

This application of electricity or galvanism ozonizes or oxidizes vitiated air, and causes the purified air to be absorbed into and combined with the fecal matter so as to produce manures or other useful material.

A "sewage battery" is made by submerging in the fecal matters, and at certain distances apart, pairs of plates of electrically opposite metals, which are connected by conducting wires; these conducting wires are coated with an insulating material, except at the "point of mutual junction, where the insulating " coating ceases, so as to set free the electric current, which will " be generated by the action of the fecal fluids on the positive " and negative plates, and allow it to act on the fecal matters, " in order to deodorize and disinfect them."

Cones of porous material, "having wires leading from their " upper part to the fecal matters at their base," may be used to raise fecal matter in a purified form to a higher level, the wires and cones being charged with electricity.

The production of flame or heat by the electric force may also be used for burning, deodorizing, and disinfecting the offensive gases.

[Printed, 4*d.*]

A Disclaimer and Memorandum of Alteration (numbered 1499*) was filed on March 31st, 1859, by the aforesaid John Chisholm.

The principal alterations in this Disclaimer and Memorandum of Alteration consist of a more perfect description of the action of ozone upon the vitiated gases, and of the effect of the "sewage "battery" upon the fecal matter and the gases therefrom. The ozone is not only said to be "reformed" as rapidly as it becomes absorbed, but "reformed or produced as rapidly as it becomes "absorbed." Instead of the electric current being set free at the junction of the conducting wires of the "sewage battery," the wires are insulated up to their points of junction "with the "plates;" the noxious matter between the plates is acted upon by the electric current passing between the plates, "fresh sewage "matter continually taking the place of that acted on." In some cases the wires of the "sewage battery" are carried near to the crown of the sewer and not united by "soldering," but "by a "medium offering considerable resistance to the passage of the "current, so that heat or sparks are produced" which act on the vitiated atmosphere of the sewer, and produce the decomposing and disinfecting effects referred to.

[Printed, 4*d*.]

A.D. 1858, July 7.—N° 1520.

SCHILLER, Henry Carl.—"Certain improved apparatus for "laying down and recovering submarine telegraphic cables."

In laying down a cable, the vessel carrying the cable tows astern a suitable number of steam tugs, each of which carries an adjustable sling. The lower end of each sling is made to support the cable, at suitable distances apart and depths, by means of "a block "with two sheaves or pulleys (one above the other) between "which the telegraphic cable passes." "Each sling is to be "attached to its preceding and succeeding ones by suitable "diagonal braces or other gear; but if the slings be so arranged "as that they hang between the vessels, each vessel (excepting "the first and last) sustaining two ends of the slings, viz[t], the "after end of that preceding, and the forward end of that suc-"ceeding her, then the diagonal braces will not be required."

In underrunning the cable, in order to recover it, "the same "apparatus is employed, but reversed."

An indicator buoy is connected to the vessel next to the cable; by the motions of this buoy it is known whether it is necessary to haul in or to pay out the slings.

When the cable is recovered, and the place of fracture or injury obtained, in order to release the cable from the blocks which support it under water, a fastening pin in each block is expelled by means of an electro-blasting apparatus. This arrangement is not mentioned in the Provisional Specification.

Various kinds of springs for supporting the blocks, and other details, are described in the Specification and shown in the Drawings.

[Printed, 1s. 5d.]

A.D. 1858, July 8.—N° 1538.

SAMUELS, Samuel.—(*Provisional Protection only.*) "Improvements in laying submarine telegraphic cables."

The inventor states:—"My invention of improvements in "laying submarine telegraphic cables consists in passing the "cable from the ship into the water through some convenient "opening made in the ship at or near the centre of the vessel "instead of from over the stern. As the centre of the ship is the "point where there will be the least motion from the pitching "or rocking of the vessel, it will be evident that there will be less "strain on the cable if payed out from a central part than if "delivered at the stern or quarter. In carrying out my invention "I propose to pass the cable from the deck down an inclined "metal or other pipe or way extending from the deck or some "other convenient part of the vessel to a hole or opening made "in the bottom near the keel. This tube or way is to be pro-"vided at top and bottom with antifriction rollers or wheels "to prevent the friction from impeding the paying out of the "cable. Any convenient arrangement of apparatus may be "employed for regulating the paying out. As a modification "of the above, the cable might be delivered through a pipe "or other suitable analogous contrivance placed at either side "of the ship near amidships, but I consider that it is pre-"ferable to deliver it through a hole made in the bottom, as "above mentioned."

[Printed, 3d.]

A.D. 1858, July 13.—N° 1573.

FIELD, JAMES JOHN.—"A new method of supporting and "carrying telegraph wires, ropes, and cables."

This invention "consists in supporting telegraph wires, ropes, "and cables in the air by means of balloons or vessels con- "taining light gaseous fluids. These vessels may also be "employed for carrying the wires, ropes, and cables.

"In consequence of the greater lightness of certain gases over "atmospheric air, I am enabled to render such gases available "for supporting telegraphic wires, ropes, cables, or any other "such media as are or may be used for electro-telegraphic com- "munication.

"In establishing this aerial telegraph, I take a conductor of "considerably greater length than the distance between the "terminal stations, and, if this distance be short, attach the ends "of the conductor to the stations, and then buoy up and per- "manently float the intermediate portion at a convenient dis- "tance from the surface of the earth by attaching to it one or "more balloon bags with a suitable gas, and allowing them to "ascend, bearing the conductor with them; where the distance "is greater, I fasten the conductor to one station only, & "attach and inflate the balloons, &c. as I recede towards the "other station. By this method of support electric communica- "tion may be established over oceans, seas, lakes, &c. without "employing a heavy and costly cable, one wire being in some "cases sufficient, or a number of wires may be raised at the same "time and supported by one series of balloon bags, each wire "being a distinct conductor, & the whole several telegraphs "established at one operation."

[Printed, 3d.]

A.D. 1858, July 14.—N° 1587.

MACLEAN, JOHN.—(*Provisional Protection only.*) "Improve- "ments in machinery or apparatus for laying or submerging "telegraph cables in water."

From the ordinary paying-out apparatus the cable passes "beneath a grooved wheel running free in bearings carried by the "deck of the vessel, and thence it ascends and passes over a "grooved wheel set in bearings on the top of a long vertical

" traversing shaft or pillar, the lower end of which is set in a " vertical tube or guide carried by the vessel. This shaft or " pillar and wheel is retained at its highest elevation by the action " of counterweights, suspended from chains attached to the shaft " or pillar at the top, which chains are passed over guide pulleys " overhead. The bottom guide of the shaft or pillar also contains " springs, on which the lower end of the shaft or pillar bears " when it is traversed downwards by any strain." The cable passes from the said pillar downwards to a grooved wheel upon deck, thence over another similar pillar, and so on until it arrives at the last grooved wheel on deck, "or in such a position " that the cable may reach the water at an angle of about 45 " degrees." "In this way a sufficient length of cable is always " retained within the limits of the paying out apparatus to allow " for the occurrence of any sudden strains." "Various agents " may be employed for causing the depressed wheels to regain " their elevation as the strain passes off." "The same general " arrangement may also be employed to act in a horizontal " position upon the vessel's deck."

[Printed, 3*d*.]

A.D. 1858, July 16.—N° 1605.

DE BERGUE, Charles.—" Improvements in electric telegraph " cables for submarine purposes, and in the machinery for " manufacturing such cables, and also in the machinery to be " used in paying such cables out of ships at sea."

1st. To make a cable of light specific gravity, the gutta-percha-covered core is surrounded by cords or metallic wires parallel to its length, the said cords are held in position by two layers of binding twine, one layer wound in one direction, the other in the opposite direction.

2nd. Machinery for manufacturing the above-described cable. In order to direct the cords evenly upon the core, as both are received from the reels of the machine, two guides are provided, one smaller one for the core, the other for the cable after the cords have been collected and placed upon it by the first guide. The binding over with twine is effected by machinery, the shuttles of which work near to one another and revolve in opposite directions.

3rd. " Arranging suitable paying out machinery for this kind " of cable." In order to pay out considerably more cable than the actual straight distance traversed, the grooved pulleys over which the cable passes from the hold of the paying-out vessel are driven by steam or other power regulated to the speed of the vessel through the water, " so as to be always paying out as fast " as the ship is going ; the last sheave guiding the cable over the " side or stern of the vessel into the sea should be also connected " to the engine and driven by it."

[Printed, 7*d.*]

A.D. 1858, July 16.—N° 1606.

VOSS, MARCUS.—(*Provisional Protection only.*) " Safely sub- " merging ocean telegraph cables & other heavy bodies in " rivers, lakes, and seas, by means of inflated buoys and connect- " ing gear."

The buoys " are to be attached to the cable at stated distances. " At starting, when a sufficient length has been payed out " and buoyed, so many of the buoys are to be detached, per- " forated, or destroyed as to permit that part of the cable to " descend." " At a certain depth, owing to the density of the " water, a gradual displacement of the contained air ensues, and " this loss of sustaining power acting on the buoys in succession, " the surface ones are in turn submerged, and in turn ex- " hausted."

" The further use of the buoys is to provide against the " loss of the cable in case of breakage. Preventive gear is " arranged to connect them with machinery on board, by which " the two last buoys and the portions of cable attached are " always under the command of the persons employed, ensuring " the recovery of the broken end for re-splicing or effectively " buoying till further arrangements are made. The machinery of " the preventive gear pays out and reels home at the discretion of " those in charge, and may be worked by connecting it with the " ship's engines."

[Printed, 3*d.*]

A.D. 1858, July 16.—N° 1607.

ARKELL, PETER, and MELHADO, ALFRED. — " Improve- " ments in the submerging of telegraph cables."

"The chief object of this invention is to facilitate the sub-
"merging of electric telegraph cables by preventing the possi-
"bility of their breaking by the action of torsion."

"In order to neutralize this effect, we propose to attach to the "cable at given distances apart, and while it is being submerged, "floats of such a construction that they will when they enter the "water, offer considerable resistance to the tensile strain of the "cable, and at the same time serve to buoy it up, and relieve the "paying-out machinery from a portion of the direct strain of the "cable." "These floats we prefer to make of wood, like wings "in plan view, and wedge-shaped in cross section, and provided "with a suitable clamp or spring clip at their upper surface for "gripping the cable and holding it firmly. When these floats "are applied to the cable and submerged with it, their tendency "will be to assume a horizontal position, and being properly fixed "on the cable, they will effectually resist and neutralize the "tendency of the unrolled coil to turn in the water, and twist the "fibres of the wire of which it is composed."

[Printed, 10*d.*]

A.D. 1858, July 23.—N° 1659.

MARKS, Levy Johnson.—"Improvements in compasses."

In addition to the ordinary needle, several magnets are applied to the card, "by preference radiating from the axis of the card, "and at equal distances from each other."

In the Provisional Specification it is stated that those magnets "to the north pole of the card" are magnetized north, and that "those to the south" are magnetized south.

In the Complete Specification it is stated that "the outer "ends" of the extra magnets "are magnetized alternately north "or south."

It is preferred that the extra magnets be placed on edge. There is a chamber, concentric with the compass box, shown in the Drawings; it is preferred that the partitions forming this chamber be of iron, and that the said chamber "be filled with pieces of "iron; compasses thus constructed are not only adapted for use "on iron ships, but in mining operations, and other situations "where they are very liable to local attraction."

[Printed, 5*d.*]

A.D. 1858, July 23.—N° 1663.

BROCKELBANK, George.—(*Provisional Protection only.*) "Improvements in laying submarine cables for telegraphic purposes."

"This invention has for its object improvements in laying submarine cables for telegraphic purposes. For this purpose the telegraphic cable, as it is payed out from the ship which carries the coil, is passed down a sustaining cable which is attached to the stern of this ship. The sustaining cable is of such a length as to support the telegraphic cable to within such a distance of the bottom as to avoid all risk of fracture, and is itself supported at one or several points in its length by ropes, and each of these ropes is attached to the sustaining cable, and passes from it to the surface, where its other end is connected to another ship, which is either towed or steams at a certain distance behind the ship from which the telegraphic cable is being payed out. In this manner the sustaining cable is caused to assume such a curve that but a slight strain will fall on the telegraphic cable, which latter, as it runs down the sustaining cable, is supported from it at short intervals by being passed through suitable pulleys fixed to the sustaining cable."

[Printed, 3*d*.]

A.D. 1858, July 26.—N° 1687.

GODEFROY, Peter Augustin.—"Improvements in the cleansing of gutta percha, and in the more perfect insulation of electric telegraph wire."

1st. The cleansing of gutta percha. The gutta percha to be cleansed is placed in a case or chamber, from thence it is forced by hydraulic or other power against a revolving rasp. A continuous stream of cold water flows over the rasp whilst in motion, and the granulated or rasped substance is allowed to fall into a vessel of cold water which is kept in constant motion; "this precipitates the refuse dirt and leaves the gutta percha floating." "The gutta percha is then taken from the tub or tank and submitted to the masticator."

2nd. The insulation of electric wire. To enable the gutta percha to adhere perfectly to the wire, the wire is heated to a temperature of from 160° to 180° Fahrenheit. The gutta percha is

supplied to the wire, as it progresses through the covering machine, by means of a die, the said die being in connection (by means of a cone) with heated cylinders containing gutta percha. The coated wire is then passed through grooved compressing rollers into a tank of cold water "which sets it and renders it "perfectly rigid."

[Printed, 10*d.*]

A.D. 1858, July 28.—N° 1708.

BUCKINGHAM, WILLIAM, HUMFREY, CHARLES, and SYKES, LUKE RICHARDS. — (*Provisional Protection only.*)

"Improvements in the construction of telegraphic cables."

These "improvements consist in forming the rope or cable "which encloses and insulates the electric wires of submarine "and other telegraphs of silk or other fibrous non-conducting "materials, either alone or in combination with animal hair, and "saturating such rope with gutta percha. For the purpose of "rendering the gutta percha more capable of resisting injury "from external causes, we propose to mix it in the melted state "with finely powdered glass, silica, or other non-conducting sub-"stance, and therewith saturating the rope as above described."

[Printed, 3*d.*]

A.D. 1858, July 31.—N° 1736.

CONYBEARE, HENRY.—"Improved apparatus and machinery "for the laying of submarine telegraph cables."

This invention "consists in the construction of machinery "composed of a resilient and articulated series of segments or "frames which extend from the stern of a vessel employed in the "submerging of submarine telegraph cables, and over which "machinery the cable is to be paid out, being delivered from a "trumpet-mouth shaped congeries of friction rollers situated at "the outer extremity of the frame furthest from the stern, in "which machinery the resiliency decreases gradually from that "part of the apparatus next to the stern to the extreme outer "end thereof, in a manner similar to that in which the resiliency "diminishes from the butt to the top joint of a jointed fishing "rod."

The method of giving the requisite amount of resiliency to the segments or frames is by means of ropes or chains, that may

themselves have India-rubber or other springs. The said ropes pass through pulleys that are suspended from a rigid spar of wood projecting from the vessel's stern. At the inboard extremity, the said ropes are connected with wheels of suitable size and having resilient springs that act upon their axles.

[Printed, 10d.]

A.D. 1858, July 31.—N° 1740.

DE BERGUE, CHARLES.—" Improvements in submarine tele-" graphic cables, and in machinery for paying out or laying down " the same."

This invention consists of improvements upon the invention set forth in N° 1605 (A.D. 1858).

1st. Constructing cables of the description mentioned in the aforesaid Specification with only one layer of binding twine.

2nd. Forming each of the longitudinal cords of the cable, of two or more strands twisted together, so that the rough surfaces of the said cords may become pressed into the gutta percha core and thereby be prevented from slipping thereupon.

3rd. Cementing the above-mentioned twisted strands together and to each other by means of Jeffrey's marine glue or other suitable cement.

4th. Saturating or coating the longitudinal cords with gutta percha and " consolidating them with the gutta percha core by " heat or otherwise."

5th. Saturating or coating the binding twine with gutta percha and " consolidating it with the longitudinal cords by heat or " otherwise."

6th. " Creosoting the materials or some of them employed in " and for the manufacture of electric telegraph cables."

7th. " Constructing an apparatus for enabling a reserve of " cable to be at all times ready in advance of the main coil in the " hold of the vessel." This apparatus consists of a compound series of pulleys arranged in two systems which can approach to or recede from each other; the cable passes through or over the said pulleys.

8th. Constructing machinery to pay out the cable by an emissive force as great as (or greater than) the force which would be due to the simple strain from the weight, &c. of the cable itself. This emissive force is obtained by means of gripping rollers driven by

steam power; they clip the cable, draw it out from the hold of the vessel, "and force or deliver it out into the water at a speed " equal to or exceeding that at which without such arrangement " it would leave the vessel."

[Printed, 7d.]

A.D. 1858, August 2.—N° 1742.

CRISPIN, WILLIAM HENRY. — (*Provisional Protection only.*) " Improvements in the construction of electric telegraph cables."

According to this invention the use of metallic wires as a covering to electric telegraph cables is entirely dispensed with, except in the case of the shore ends of the cable requiring such protection.

" The telegraphic wires having received an external coating of " gutta percha or other analogous and equivalent insulating " material, another coating of the like material combined with " hempen fibre, intermixed therewith in the course of construction " so as to form one body, is given to the same, the whole being " then surrounded with an external covering of ordinary rope, " made in one or other of the usual methods of rope making of " any suitable number of strands, or plaited rope may be used " for the same purpose, the same being rendered impervious to " water and protected from the effects of other injurious in- " fluences by the use of tar or any analogous preservative sub- " stance or material.

" Instead of the method of construction lastly described the " following may be used:—The coating of gutta percha or other " insulating material in combination with hempen fibre may be " dispensed with, the telegraphic wires being surrounded with " the insulating material alone of a desirable thickness, and the " same being then externally covered with hemp or rope."

[Printed, 3d.]

A.D. 1858, August 2.—N° 1752.

GREAVES, HUGH.—The title of this invention is "Improve- " ments in constructing streets, roads and ways, thereby facili- " tating traffic and providing for the more convenient con- " veyance of sewage, drainage, gas, and water supplies and tele- " graphic wires along the same."

The principal part of this invention relates to certain arrangements of roadways, footways, and carriageways, but the Specification describes and the Drawings show a method of establishing roadways and railways supported upon columns, and of affording accommodation for telegraphic wires under this upper roadway. It is also proposed by the inventor to construct footways of grids of cast iron, supported in such manner as to leave a space beneath for the placing of pipes for telegraph wires and for other purposes.

The above-mentioned columns are situated "along the central " part of the carriage way." The pipes for the reception of telegraph wires are represented as being beneath the roadway or railway.

In another plan the columns are placed near to the edge of the footpath; in this instance they are farther asunder than they are in the above-mentioned plan; they are strengthened by means of lattice girders.

[Printed, 10*d.*]

A.D. 1858, August 4.—N° 1773.

ARCHER, Charles Maybury.—(*Provisional Protection only.*) The title of this invention is "Improvements in electric & " submarine telegraph cables & wires."

The inventor states:—

"(After some months' attention to the subject,) namely, that " of manufacturing an elastic cylindrical spring or spiral cable " formed in continuous close rings, composed as to its inner core " of the present materials, but untwisted & not in convolutions, " but manufactured in the form of what are known as 'check " 'springs' instead of a rigid & inflexible metallic rope, so that " when distorted & compressed by paying-out or other causes it " may have the power of resisting longitudinal strain & of re- " storing itself & giving it the amplest power of tension & ex- " pansion."

"I claim the application of the check spring or cylindrical wire " spring or spiral principle to submarine telegraph cables & wires, " & to all cables, ropes, & rigging, or of any portions of the " same."

[Printed, 3*d.*]

A.D. 1858, August 7.—N° 1797.

WALKER, JOHN.—" Improvements in the manufacture of elec-" tric telegraph cables."

The inventor states:—" My invention consists in manufac-" turing telegraph cables by surrounding the material employed " for insulating the conducting wire or wires with a flexible tube " composed of wires, whereby the insulating material and the " conducting wire or wires are effectually protected from com-" pression. Strands of hemp or other vegetable fibre, or of " thread, twine, or cord may, if desired, be laid parallel with the " conducting wires between the insulating material and the " flexible wire tube. In some cases I enclose the cable thus made " in a sheath or tube of gutta percha or caoutchouc. Where a " heavy and strong cable is required I cover the flexible wire tube " either directly or after first encasing it in a braided fibrous tube " with wires or strands of wires laid spirally."

The Complete Specification describes and the Drawings show cables manufactured as above set forth, and consisting of three copper conducting wires covered separately with caoutchouc stiffened "with pulverized charcoal or fine glass." Gutta percha is applied " over all the wires prepared as described, so as to unite " them."

[Printed, 6d.]

A.D. 1858, August 9.—N° 1811.

SMITH, WILLOUGHBY.—" An improved compound for coating " or insulating electric telegraph wires, and for coating other sur-" faces."

" The compound consists of about three-fifths, by weight, of " gutta percha, one-fifth of Stockholm tar, and one-fifth of resin, " and is prepared by first mixing in a vessel, by preference heated " by steam, the tar and resin, and then adding the gutta percha. " When the whole is thoroughly incorporated it is applicable for " several useful purposes, such as insulating telegraph wires, " lining battery cells, water cisterns, cases, &c., &c."

The inventor does not confine himself " to the use of these " precise proportions, as they may to some extent be varied."

[Printed, 3d.]

A.D. 1858, August 9.—N° 1814.

NEWTON, WILLIAM EDWARD (*a communication*).—"An im-"proved method of arranging and applying magnets to coun-"teract or compensate for the effects of local attraction on the "mariner's compass."

This invention "consists in the arrangement of one or more "magnets in a horizontal position or positions below or above the "needle of the compass, with opposite poles horizontally in line "with the vertical centre or axis on which the needle turns, and "on opposite sides thereof, by which arrangement the opposite "poles of the magnet or magnets are caused to act upon the "needle to force it into the same direction. It also consists in "applying the so arranged magnet or magnets in such a manner "as to make it or them adjustable on a centre coinciding as "nearly as practicable with the vertical axis on which the needle "turns, so that their poles may be made to point in any direction "necessary to compensate for the local attraction, and may have "their direction varied to meet any variation in the point or "points of local attraction that may be produced by different "cargoes or by other causes. And it further consists in providing "for the adjustment of the so arranged and applied magnets in "a direction parallel with the axis or vertical centre on which the "needle works, for the purpose of increasing or diminishing the "intensity of their action according to the intensity of the local "attraction."

The Specification and Drawings set forth the invention "applied "to a binnacle in such a manner as to make it constitute what "may be termed a compensating binnacle."

[Printed, 7*d*.]

A.D. 1858, August 11.—N° 1828.

APPOLD, JOHN GEORGE.—(*Provisional Protection only.*) "Im-"provements in the manufacture of wire ropes or cables."

This invention relates more particularly to the manufacture of submarine electric telegraph cables, and has for its object the prevention of their untwisting during the operation of paying out.

It is proposed "to divide the wire strands into two sets, which "shall be laid round the internal core in opposite directions. "For instance, instead of employing strands consisting each of

" seven wires twisted together, and laying all such strands round " the core in one direction," it is proposed "to make strands " composed of four wires twisted together, and laid round the " core in one direction;" after which other strands are made " composed of three wires twisted together;" and these strands are laid "over or round the other strands, but in the opposite " direction, and thereby all tendency of the one set of strands " to untwist will be counteracted by the other set, and therefore " the cable or rope will remain undamaged from such a cause as " has heretofore materially affected it.

" An obvious modification of this mode of protecting the in- " ternal core consists in plaiting the protecting wire strands round " the core."

[Printed, 3d.]

A.D. 1858, August 13.—Nº 1848.

LIGHT, Charles Llewellyn.—The title of this invention is " Improvements in electric telegraph ropes or cables."

The inventor states:—

" The object of the first part of my invention is to enable the " conducting wires of electric telegraph ropes or cables to yield " without injury to any strain which the outer protecting wires " may be capable of resisting; and the objects of the second part " are to prevent the outer protecting wires from tending to un- " wind, also to increase the strength of the rope or cable.

" My invention consists, first, in winding the copper or other " conducting wires of electric telegraph ropes or cables around " a central core of gutta percha or other suitable material; and, " secondly, in winding the outer protecting wires or strands of " any suitable protecting material of such ropes or cables in two " layers or sets, one layer or set being laid in a direction contrary " to that of the other."

[Printed, 5d.]

A.D. 1858, August 19.—Nº 1889.

DELFOSSE, Maximilien François Joseph.—(*Provisional Protection only.*) " Improvements in electro-magnetic machines."

" This invention relates to that class of electro-magnetic ma- " chines in which powerful induced currents are obtained by the " revolution of wheels or discs carrying cores of soft iron sur-

"rounded with coils of wire, and made to revolve between the "poles of fixed permanet" [permanent?] "magnets. The "induced currents are collected from the whole series of coils, "and conveyed by metal conductors to be used as required. The "present improvements consist in the apportioning of the number "of coils composing each disc or wheel to the magnets between "which they pass; in arrangements of the conducting rings in "order to avoid the electric spark; in the employment under "certain circumstances of uninterrupted or unsplit annular rings; "in means of coupling the coils according to the intensity or "quantity of the current desired to be obtained; in the arrange-"ments of the coupling of the coils with the split or full rings "for those applications where the electric currents are required "to be fixed or changeable, of weak or strong intensity; and in "the employment of split coils for the purpose of increasing the "energy of the currents."

[Printed, 8d.]

A.D. 1858, August 20.—N° 1900.

BAKER, ALBERT.—(*Provisional Protection only.*) "An im-"proved method of and apparatus for submerging or laying "under water electric cables, wires, or lines, and for the recovery "thereof."

This invention relates to a "kink indicator apparatus," also to "self-inflating, buoyant, & retarding floats;" also to "self-"attaching and self-detaching nippers;" these being respectively apparatus used in submerging electric cables or in recovering them.

The "kink indicator" consists of a hinged weighted lever that carries rollers over which the cable passes as it is payed out; the cable also passes through tubes of such a size and shape as to reduce the kinks before they can pass overboard. When a kink meets the above-mentioned rollers the lever is moved from an upright position to a horizontal one, and a wire attached to its lower end is in consequence able to ring a bell in the engine-room or other convenient place.

The "float" and "nipper" combined consists of a certain arrangement of boards hinged together with an air-tight fabric and having "a screw plug" and handles, also of "nipper boards" to

grip the cable. "The object in question" is "somewhat on the "principle of a pair of bellows."

Some "nippers" are made with "toggle pins" that are soluble in sea water, and thus disengage themselves from the cable in a given time after attachment.

Other details are set forth.

[Printed, *4d.*]

A.D. 1858, August 23.—N° 1916.

JENCKEN, Henry Diedrich (*partly a communication*).—(*Provisional Protection only.*) "Improvements in electric tele-"graphs."

"This invention consists in the employment of the earth itself "as a conductor of galvanic, magnetic, electro-magnetic, and "electric fluids of all kinds without any conducting wire or "wires; in the employment of substances in a dry or wet state "under ground for the purpose of producing an electric current "at the transmitting and receiving points or stations; in insula-"ting and preventing by non-conducting substances any lateral "action from interfering with the direct communications from "point to point; in changing the characters of the electric "fluids," whereby the inventor is "enabled to prevent the inter-"fering action electric currents would be liable to in their course "from one point to another."

As, for example, "coal and zinc in pieces, held together by "wire," are buried in the ground at the transmitting station, the wire from the coal is united "to a conductor leading to a sig-"nalling apparatus," that "from the zinc to an electro-magnet." The same is done at another point or station. "By closing at one "station the connecting link of the signalling apparatus," the inventor obtains "the deflection of the needle of galvanometer "and other effects usually produced at the other station," and he obtains "the electric signal."

[Printed, *3d.*]

A.D. 1858, August 24.—N° 1924.

MACINTOSH, John.—"Improvements in insulating telegra-"phic wires or conductors, and in apparatus employed therein, "part of which apparatus is applicable to the manufacture of "tubes from India-rubber."

1st. Covering telegraphic conductors with India-rubber by means of an improvement upon the process set forth in N° 1090 (A.D. 1858). "Now, when a wire or conductor of large size is "employed, I find it desirable to place other or secondary rollers "in contact with the grooved rollers already described, one at "each of the points where the india-rubber is fed into the grooves, "and on these secondary rollers are formed beads, corresponding "in size to one-half of the wire or conductor; these beads are "adjusted so as to fall exactly in the middle of the groves of the "principal rollers, so that they form indentations in the india-"rubber suitable to receive the wire or conductor." The conductor may consist of metallic powder filled into the above-mentioned indentations. Instead of India-rubber, a composition of India-rubber or gutta percha combined with shellac may be used for covering conductors by this process.

2nd. Covering telegraphic conductors with gutta percha and at the same time combining yarns with the said covering. A cylinder that is closed at the ends contains a screw of long pitch, which exactly fits within it and is mounted "on a hollow axis "passing through the ends of the cylinder; through this axis the "yarns and the wire or conductor to be covered pass, and the "bobbins from which the yarns are drawn are mounted on a "frame fixed on the end of the same axis; the cylinder has an "opening in its side near the end, at which the yarns enter for "feeding in the gutta percha or other covering material. When "the axis is caused to rotate, the gutta percha or other covering "material is pressed out through a passage or passages at the end "of the cylinder, and it passes into a small box or chamber fur-"nished at its end with a die such as is usually employed, so as to "cover the wire or conductor, and so that the yarns become im-"bedded in the covering."

When more than one coating is given to a conductor, a current of cold air is made to impinge upon the first coating, so as to bring is rapidly into a proper state for receiving the second coating.

[Printed, 4d.]

A.D. 1858, August 30.—N° 1965.

CLARK, Josiah Latimer, BRAITHWAITE, Frederick, and PREECE, George Edward.—"Improvements in telegraph "cables."

1st. Forming the water-tight and non-inducting coating mentioned in N° 2956 (A.D. 1853), by passing the wires and yarns through pitch "at the time of manufacture, and laying up the "cable in a hot state." The yarns are dessicated and the pitch is injected under pressure, the wires, yarns, and pitch being submitted to the influence of a vacuum and subsequent pressure.

2nd. "A method of preserving submarine or other iron tele-"graph cables from decay, by surrounding the iron or steel wires "with a compound of pitch, tar, asphalte, or other similar well-"known preservative materials, retained upon and around the "cable by strands or flat bands of hemp or other fibrous material, "saturated with the preservative substance or mixture, and "plaited or braided round the cable, or coiled around the cable in "such manner as either to envelope it completely, or to form a "worming in the interstices between the wires."

3rd. Preserving iron cables from decay "by intermingling "among them one or more wires of zinc in place of iron, whereby "the iron is kept in an electro-negative condition, and thereby "preserved from oxidation or decay."

4th. Joining the iron wires and conducting wires of submarine cables. A collar, cut with right-handed and left-handed screw threads, is made to screw on to the respective ends of the wire which are cut with corresponding screw threads. In small wires, the ends may be put into a ferrule and flattened.

5th. Forming the conducting wires of telegraph cables of such a cross section that, when combined together, they may form a solid cylindrical wire.

[Printed, 6d.]

A.D. 1858, August 31.—N° 1977.

JOHNSON, John Henry (*a communication from Jane H. Lloyd, George T. Parry, and Henry D. Beylard*).—"Improve-"ments in the prevention of steam boiler explosions."

"The said invention relates to a peculiar system or mode of "preventing steam boiler explosions arising from scarcity of "water in the boiler, and an undue heating of the plates, and "consists simply in placing within the boiler a metallic electric "conductor insulated from the boiler plates, and made to com-"municate with the exterior of the boiler, whereby an electrical "equilibrium is maintained between the inside of the boiler

"and the outside thereof, and an explosion of the boiler when "the water becomes low, and the plates unduly heated, is pre-"vented."

The Patentee states that the explosive gases, generated by the contact of steam with red hot plates, are only ignitable by contact with a flame or with an electric spark, and that the electric force generated by the production of steam is kept within the boiler and prevented from giving a spark to the plates as long as the mineral lining of the boiler is intact, but that as soon as this lining becomes cracked, an electric spark is produced which ignites the gas and causes the explosion. This invention, by maintaining the electric equilibrium, is said therefore to prevent steam boiler explosions.

The Drawings represent a pointed conductor inside the boiler which has an insulated rod passing through a stuffing box in the upper part of the boiler and terminating in a metallic knob.

[Printed, 6d.]

A.D. 1858, September 2.—N° 1994.

BLEAKLEY, JAMES.—"Improvements in apparatus for com-"municating between the guard and engine driver of railway "trains."

In the Provisional Specification electricity only is mentioned as being the means of communication; the Complete Specification sets forth that the communication is made "by means of electri-"city magnetism or other means," and a description is given of a method of making the said communication by means of "novel "and powerful breaks" which can be employed separately or in conjunction with the "improved telegraph."

The continuous electric connection through the train is made by means of a wire or wires fixed on every carriage; the wires of each separate carriage are connected together by means of "a "small hook at each end" or "by twisting the ends around each "other, or in any other convenient manner, the said ends being "composed of small soft copper wire." The coupling links, shackles, or chains of the carriages, or the rails of the permanent way, may also form the "conducting medium."

The signals may either be the ignition or explosion of a com-bustible substance, or other suitable signal. In the roof of the guard's van is an opening through which the guard can hoist the

usual day or night signals, when the attention of the engine driver has been called by the detonating or other signal.

The Drawings show a reel in each carriage on which extra conducting wire is wound.

[Printed, 7*d.*]

A.D. 1858, September 3.—N° 1998.

ROBERTSON, James.—" Improvements in driving belts and " springs." In a part of this invention magnetic force is employed.

This invention " relates to the application and adaptation of " corrugated, undulated, or indented plate or sheet metal to the " construction of driving belts and springs."

In one construction of spring, described in the Complete Specification and shown in the Drawings, it is recommended to magnetize the spring. This spring is " a single-plate tension spring formed " with deep and overlapping corrugations to give it an extra " range or extent of action. This spring may be magnetised, " whereby the resulting attraction between the adjacent corruga- " tions will tend to render the action of the spring more uniform, " such attraction being greatest when the resisting power of the " spring is weakest."

A corrugated metal belt is described in the Complete Specification and shown in the Drawings, which " may be magnetised " increase its adhesion upon a plain iron pulley or upon a steel " rim fixed on the pulley."

[Printed, 2*s.*]

A.D. 1858, September 4.—N° 2007.

PIGGOTT, William Peter, and BEARDMORE, Septimus. —" Improvements in vinous and fermented liquors."

This invention consists of the application of electric currents to " wines, spirits, or other fermented liquors," for the purpose of improving their quality.

One method of applying electric force is to place separate porous cells in the vessel holding the liquor, the said porous cells containing exciting liquid and the positive and negative metals respectively. When the metals are connected by a wire, the electric circuit is complete, the liquor forming a part of the said circuit.

In another method each porous cell contains a positive and a negative metal; counter currents are thus sent through the liquor.

" Piggott's atmospheric battery," with or without the helix, may be used as the source of electricity.

Electricity is applied " to wine in bottle by placing the negative " and positive metals or substances in connection with the " cork."

" The cask, jar, bottle, or other vessel " may be made " partly " of positive and partly of negative metals or substances, so as to " create currents whenever the vessel is filled with liquor."

[Printed, 6d.]

A.D. 1858, September 6.—N° 2013.

HOGA, Stanislas, PIGGOTT, William Peter, and BEARDMORE, Septimus. — (*Provisional Protection only.*)

" Improvements in submarine electric telegraphs."

" The invention consists in new means of producing a current " of electricity entirely different from the means by which all " telegraphic communications have hitherto been effected." The negative and positive elements are placed in the sea, one being in proximity to one shore, the other to the other shore. "These two " elements are connected by a wire or cable, either insulated or " uninsulated."

This invention " is applicable to telegraphs communicating " from land to land, with the intervention of water between " them. It is proposed to carry it out by wires, either insulated " or uninsulated. It is capable of being applied to some of the " existing submarine telegraphs without interfering with existing " arrangements. In such cases it is proposed, if desirable, to " transmit messages at the same time as those resulting from the " current formed by existing batteries."

[Printed, 3d.]

A.D. 1858, September 14.—N° 2081.

VIDIE, Lucien.—" Improvements in apparatus for measuring " the pressure of fluids by the flexion of diaphragms."

This invention "relates to various improvements in the con- " struction of barometers and other apparatus without liquid,

" and acting by the flexion of diaphragms for measuring the " pressure of air and water."

"An apparatus for measuring the pressure or depth of liquids, " and preserving on the dial the indication obtained after the " immersed instrument is drawn out of the liquid," consists of a weighted box containing a flexible diaphragm on which the pressure of the liquid is free to act. The diaphragm acts on a spring "which communicates motion to the principal axis by " means of a lever, chain, and pulley, or by means of a segmentary " toothed rack, or by any other convenient mechanism." A small spring, gearing with the ratchet teeth of the indicator dial, prevents the return of the dial when the apparatus is taken out of the liquid.

"For preparing the instrument for another immersion after " reading off the indication of the dial without opening the ap- " paratus," various means are employed. In one instance the above-mentioned small spring is attracted "with a magnet held " in front of it outside the box, which at that part is made much " thinner than the other parts."

In the construction of the above-mentioned barometers, the vacuum is closed under the air-pump receiver by "employing " the electric spark by known means, and in use for melting " metals."

Other improvements, not involving the application of electric or magnetic force, are set forth in detail.

[Printed, 7*d.*]

A.D. 1858, September 18.—N° 2110.

GRYLLS, Henry William.—"Improvements in apparatus " employed in submerging or laying down electric telegraph " cables."

"My invention consists in an apparatus to be used when a " submarine or other cable is being either submerged or laid " down, or when it is being again taken up, by means of which, " in case of fracture or other accident, a hold may be taken of " the cable at any required distance from the stern of the ship, " and the portion of cable saved, which may have been already " paid out, if such fracture take place at any point between the " stern of the vessel and the portion of the cable where my im- " proved apparatus is situated, and I propose to carry out my

"said invention in the following manner, that is to say, I pass "the cable through a strong metal guide ring which is suspended "to the stern of the vessel by chains, or wire or other rope of "any required length. To this guide ring is attached a second "ring formed of two or more segments, connected together by "hinges or otherwise, and constructed so that when a chain or "rope attached to one segment is drawn tight by means of any "apparatus on board the vessel, the segments collapse and grasp "the rope firmly between them."

"The portion of cable so held may then be drawn on board to "be spliced or repaired."

[Printed, 5d.]

A.D. 1858, September 23.—N° 2137.

JALOUREAU, ALFRED FAUVIN. — "Improvements in the "manufacture of pipes," the said pipes being available "for the "conveyance of water or gas, or for enclosing electric telegraph "wires, or for other purposes."

"The process of manufacture consists in the superposition, by "rolling on a cylindrical mandril, of sheets of paper, cloth, or "other fabrics, materials, or tissues, rendered adhesive between "each layer by immersion in a waterproof mastic containing "bitumen or caoutchouc, or other waterproof material." "Thus, "in making pipes of cloth or paper, a roll of the fabric is placed "in a machine in which the cloth or paper as it unwinds is con- "ducted over or under a roller revolving in a bath of the "bituminous mastic, which is kept hot and fluid by a fire, or "heat applied to it. The fabric is then wound upon a roller, or "is pressed by one or more rollers to equalize the coating of "cement, and is then wound on a roller or mandril of the proper "diameter for forming the pipe." "The pipe may be rolled on "sand before the cement has set, or covered with bitumen and "sand on the exterior, to protect and strengthen it." The interior of the pipe may be varnished, by filling it with melted bitumen, which is afterwards poured out, and allowing the pipe to drain in a vertical position.

This process may be applied to rendering pipes of glass, wood, &c., impermeable. Pipes made according to this process can be easily joined by means of cemented metal or other collars, and

they may have branch pipes attached to holes bored therein, by means of India-rubber collars.

[Printed, *7d.*]

A.D. 1858, September 27.—N° 2161.

LANDER, William.—" Improvements in engraving and print- " ing for the purpose of ornamenting china and earthenware."

This invention " consists in engraving and printing in various " colours, adapted to the ornamentation of china and earthen- " ware from portions of plates taken by galvanic agency from a " general plate containing the whole subject."

1st. The subject is engraved, in the usual manner, upon the surface of a copper plate; as many electro-casts are taken from this original plate as there are colours to be printed.

2nd. A part of the work, previously engraved on the several plates, is erased, " so that the portion of the engraving present on " each plate shall be absent from the surface of all the rest."

3rd. " When the plates are required to be printed, each will be " restricted to one particular colour, and when the successive " impressions are made by the several plates on one paper, the " subject will then be completed for transferring to the ware."

4th. "To ensure true register in the combination of the parts " of the subject on the several plates " a metal frame is con- " structed "for securing the plates and paper from the pos- " sibility of shifting from their proper positions during the ope- " ration of printing by the rolling press."

[Printed, *5d.*]

A.D. 1858, September 28.—N° 2168.

CLARK, Josiah Latimer. — (*Provisional Protection only.*) " Improvements in coiling and securing telegraph cables, prepa- " ratory to laying them from ships or vessels."

" In coiling an electric telegraph cable into the hold or other " part of a ship or vessel, strong cords or bands are used at " intervals around the coils, the one end of each cord or band is " to be made fast and a loop is to be made therein, and such loop " is to embrace a coil of the cable, then another loop is to be " drawn through the previous one, and such loop is to embrace " the next coil of the cable, then another loop is to be drawn " through the previous one which is to embrace the next coil of

"the cable, and in this manner each coil is to be embraced by a "loop formed in each of the cords or bands, and so long as the "last end of each coil or band is retained, the loops will hold the "coils securely together, but as the ends of the cords or bands "are pulled, the succeeding loops formed in the length of the "cord or band will be released, and the coils of the cable will be "successively unlashed one from another.

"Another arrangement is to employ a number of bearers of "hoop iron or other material, which are placed radially under "each layer of a coiled cable, and in the act of laying each coil "of a cable on the radial bearers a cord or band is passed from "under each bearer over the coil, then under the bearer, then "over the next coil of the cable, and so on, by which arrange-"ment a layer of coils of a cable will be released from the lashings "by withdrawing the radial bearers from below the coils in suc-"cession."

[Printed, 8*d.*]

A.D. 1858, September 30.—N° 2180.

SIEMENS, CHARLES WILLIAM (*partly a communication from Ernst Werner Siemens*).—(*Provisional Protection only.*) "Im-"provements in electric telegraphs."

1*st.* Metallic posts for suspending line wires. Three iron or steel rods are fastened together at their lower ends by a ring of angle iron; their upper ends "enter holes or recesses in a piece of "iron pipe" or a piece of wood, and are secured by an iron ring driven down upon them. In order to give stiffness to the post, one or more lateral stays of square iron "are introduced between "the rods." The portion of the main rods at the level of the ground is protected by means of an iron tube shrunk on hot.

2nd. Insulators to be used with the above-described posts. These are similar in construction to those described in N° 459 (A.D. 1854), and are attached to the post by means of a curved cast-iron flange secured to the post by an iron ring driven over both. At the stretching posts the wires are secured to an oblong taper plate by means of rings, "so that the tension on the wire "may tend to tighten the fixing." The said plate supports the wire for some distance beyond the fixing.

3rd. Lightning conductors. A metallic stud is fastened on each post, to which stud, or to the metallic post itself, a wire is

suspended above the insulated telegraph wire or wires; "this "upper wire receives and discharges lightning."

4th. Insulating telegraph wire with India-rubber. Four rollers are used for this purpose, two of which "have each a semicircular "groove of the intended diameter of the covered wire," and the other two "carry each a semicircular bead of the diameter of the "wire to be coated." A hopper, containing caoutchouc in a plastic state, is provided to each pair of rollers. On giving motion to the machine, two semi-tubes of caoutchouc unite and encompass the wire to be coated. Another layer of India-rubber is then applied in a similar manner, "so as to break joint with the "first layer." A greater number of layers of insulating material, with a solvent between each, may be given to the wire if required. The wire is then covered with helically laid strands of hemp, and with a second covering laid in the opposite direction; finally, it is coated with waterproof material.

5th. Avoiding the Leyden-jar charge to a wire, by allowing the Morse instruments to mark signals by dots only, instead of by dots and strokes. At a second row of dots the charge of the wire is discharged. A machine is used similar to that described in N° 2366 (A.D. 1854).

6th. A receiving instrument similar to Morse's instrument in principle. The arm of the electro-magnet presses the paper against an inked band, as the said band passes round a smooth rod.

7th. A constant telegraph battery. A copper plate, placed on sand, has saw-dust above it; a zinc plate is placed on the saw-dust; sulphate of copper is supplied to the copper plate by means of a glass cylinder that surrounds the conductor, and the saw-dust is wetted with chloride of zinc, salt, or acidulated water.

[Printed, 3d.]

A.D. 1858, October 1.—N° 2187.

HIPP, MATTHÆUS.—"Improvements in electric telegraphs."

This invention consists "in a novel application of the induction "current" at the transmitting station to a modification of the Morse printing instrument at the receiving station.

A transmitting key is described and shown, which enables the current developed on the completion of the primary circuit to be sent into the telegraphic circuit in the same direction as that

developed on the breaking of the primary circuit. The battery terminals are connected to fixed studs, and the terminals of the primary coil to springs capable of being deflected from one of the battery studs by a pin on the lever handle, the lever handle forming a part of the battery circuit. By this means, "the " primary current which causes the induction current of com- " pletion circulates in a direction opposite to that which originates " the induction current of interruption."

Two or more electro-magnets are applied to the Morse printing instrument. The armature which actuates the style can vibrate between the said electro-magnets "without recourse being had to " the regulating springs."

Instead of using a relay and local battery to work the style, this result is produced "by the action of the wheelwork, the " attraction of the armature serving only to place certain parts of " the apparatus in that position in which they can be subse- " quently acted upon by the wheelwork."

[Printed, 7*d.*]

A.D. 1858, October 1.—N° 2188.

WILKINS, John Walker, and DUNN, James Benjamin.—(*Provisional Protection only.*) "Improvements in constructing " electric telegraph cables."

" The interior is made by the use of a helix produced by a " narrow band or strip of copper or suitable metal; this helix is " formed by binding the band or strip of metal on a cylindrical " mandril, of a size depending on the diameter of the intended " hollow interior of the cable; on this helix a coating of gutta " percha or other insulating material is applied so as to produce " a cylinder, on which are placed a series of narrow bands or " strips of copper or other suitable metal, the edges of which are " kept separate and at a distance apart; these bands are bent " spirally around the cylinder of insulating material, forming " very long spirals, the strips or bands of metal only slightly " inclining to the central axis of the cable. Over these gutta " percha or other insulating material is applied, so that these " long spirals of metal strips or bands are completely enclosed in " the insulating material. Over this, if desired, other similar " metal spirals may be placed, and further insulating material

" added. And to complete the cable, a band or bands of hemp
" or other fibre is bound closely around the last coating of insu-
" lating material."

[Printed, 3d.]

A.D. 1858, October 1.—N° 2189.

BELCHER, Sir Edward.—(*Provisional Protection only.*)
" Improvements in the manufacture of telegraphic cables."

" The interior conducting wire or wires of the cable are first
" covered with beads of glass, porcelain, bitumen, resin, or other
" suitable non-conducting material; the wires so covered are
" then passed through a fluid cement of resin or other non-con-
" ducting material, and are then immediately covered with a tube
" of gutta percha, so as to retain the non-conducting cement in a
" fluid state within the tube of gutta percha. The tube of gutta
" percha may then be surrounded with animal or fish glue, and
" then by a coating of wire in the ordinary manner."

[Printed, 3d.]

A.D. 1858, October 2.—N° 2192.

ROGERS, Joseph.—" Improvemements in submarine electric
" telegraph cables."

This invention relates to covering a wire conductor or wire conductors that are insulated with India-rubber, by surrounding it or them with longitudinal plaited bands of fibrous materials, and then covering the whole " by plaiting over it yarns or cords of " fibrous material." A sufficient number of longitudinal bands to encircle the insulated wire are used; the said bands are bound together " with coils of twine, seamed, roped, over-hitched, " clove-hitched, or served down." In some cases, instead of securing the longitudinal bands by binding with twine, they are applied " as the plaiting proceeds, and the plaiting then serves to " secure the bands."

Before applying the fibrous bands and yarns to the covered wire they are saturated with a composition "formed by mixing " 8 parts of rosin, 1 part of tallow, 8 parts of linseed oil or boiled " oil (preferring boiled oil), and 2 parts of patent driers; these " materials are boiled and stirred together until thoroughly " mixed. The bands and yarns are passed through the com- " position while it is kept boiling in a cauldron."

[Printed, 5d.]

A.D. 1858, October 5.—N° 2208.

OLDERSHAW, Charles Edward. — (*Provisional Protection only.*) The title of this invention is "An improved method of "constructing electric telegraph cables."

The inventor states:—

"My invention consists in constructing telegraph cables in "such manner that they may be sufficiently buoyant as to remain "at from about 100 to 200 feet below the surface of the ocean.

"I construct my cable as follows:—First, I insulate the con- "ducting wire or wires with gutta percha or other suitable in- "sulating material; round this I apply a layer or coating of cork "or other like suitable buoyant material, and cover the whole "with two layers of cord or other fibrous material in a spiral "direction, the one layer being in reverse of the other; these "fibres may be protected by tar, caoutchouc, or other like pro- "tecting agent. In order to prevent the shore ends of the cable "from resting upon the bottom of the sea, and being injured by "friction upon the ground, I make use of a covered duct, tube, "or channel at both ends, and carry the same sufficiently far "from the shore to enable the cable to be suspended free from "rocks, &c."

[Printed, 3d.]

A.D. 1858, October 6.—N° 2225.

BAYLIS, Charles.—"An improved mode of constructing and "arranging underground chambers in populous cities or towns "for the reception of gas and water pipes and telegraph wires."

These pipes and wires are placed "in underground chambers, "composed of lengths of cast iron or other tubing of any suitable "or convenient size and form, and joined together at their ends, "so as to form a continuous chamber or gallery, in which open- "ings are made at top, either in all the lengths of tubing, or at "such convenient intervals as may be desired. A convenient "mode of constructing these underground galleries or receptacles "will be to make rectangular or nearly rectangular chambers of "cast iron, with an opening extending along the upper side "thereof, and provided with grooves in which may be slidden "plates or shutters to close up the chambers. These plates "may be made with tongues and grooves to fit into one another,

" and at convenient distances apart there may be key plates, " which will hold all the others in their places, and prevent " them from being removed until the key plate is first lifted " out of its place."

"In the long continuous chamber thus obtained may be placed " the gas or water pipes, or, if preferred, the telegraph wires may " be arranged therein, and a lateral chamber may be added thereto " for the gas and water pipes."

[Printed, 10*d.*]

A.D. 1858, October 8.—N° 2239.

SEARLE, Richard. — (*Provisional Protection only.*) " Im- " provements in insulating and preserving and laying submarine " and other telegraphic wires or cables."

1st. " The application of caoutchouc or india-rubber, what is " commonly called vulcanized india-rubber however compounded, " wood, cork, or cork wood, for the purpose of insulating or " covering and protecting the insulator of submarine and other " telegraphic wires or cables."

2nd. " The application of the before-mentioned substances or " any of them, for the purpose of reducing the specific gravity of " submarine telegraphic wires or cables."

3rd. " The application of the before-mentioned substances or " any of them as buoys, for the purpose of sinking or sustaining " submarine telegraphic wires or cables."

4th. " The application of tubes composed of metallic wire, " whether spiral or otherwise, in covering and protecting sub- " marine or other telegraphic wires or cables."

[Printed, 3*d.*]

A.D. 1858, October 8.—N° 2245.

SMITH, Joseph Travers.—(*Provisional Protection only.*) " Im- " provements in electric cables."

This invention " consists in the employment or application of a " corrugated metallic tube as the conductor for the passage of " the electric current; such corrugation being either in uncon- " nected indentations directly transverse to the axis of the tube, " or in helical convolutions of one or more helices. The metallic " tube, which may be of copper or other suitable metal or alloy is

" covered with gutta percha or other suitable insulating material,
" and may be shielded with strands of hemp, tarred or otherwise
" protected from the action of water or sea water, and (if thought
" desirable) with lashings of cord or stitched canvas, after the
" manner of other telegraph cables. In some cases it may be
" found advantageous to enclose a wire or wires within the
" corrugated tube."

[Printed, 3d.]

A.D. 1858, October 9.—N° 2250.

TATLOCK, JOHN.—(*Provisional Protection only.*) " Improve-
" ments in electric telegraphs, and in telegraphic cables or con-
" ductors for the conducting of electricity in submarine and
" underground telegraphs."

1st. In order to obviate the influence produced by the action of the Leyden-jar charge in submarine and underground telegraphic conductors, the conductor is made altogether of metal instead of employing the earth circuit for half the conductor. The two wires which respectively conduct the forward and return current are separately enclosed in and surrounded with gutta percha, " so that these conductors are insulated from the surround-
" ing earth or water, and as a matter of course from each
" other."

2nd. Improvements in the coils of telegraphic indicators. These coils are made in two halves, one half on one side of the magnetized needle, the other half on the other side; the wire from each half is in connection with the same conducting wire. This arrangement shortens the length traversed by the electric current to produce a given effect.

3rd. Transmitting telegraphic messages by allowing an electric current always to traverse the telegraphic circuit. Three batteries are used, in connection with a magnetized needle and an indicating needle. Whilst two of the battery currents are passing over the coil of the indicator, the magnetized needle is deflected and the indicating needle is vertical; the subtraction of one of these currents, or the addition of the third battery current, therefore causes the deflection of the indicating needle to the right or to the left.

[Printed, 3d.]

A.D. 1858, October 9.—N° 2251.

HOPE, Lewis (*a communication*).—" Improvements in electric " telegraph cables."

" The conducting wires are first coated with india-rubber, or " compound containing india-rubber in combination with sul- " phur, or with gutta percha or compound containing gutta " percha together with sulphur. The wires thus coated are sub- " jected to heat in such manner as to produce the change in the " india-rubber or gutta percha known as vulcanization, or the " harder compounds which result from the application of sulphur " and heat. The conducting wires are then further coated in the " ordinary manner with gutta percha or gutta percha compounds, " and the cables are then completed with a coating of wires or " other materials, as heretofore."

The masticated compound of India-rubber and sulphur is applied, in a plastic state, by means of the ordinary covering apparatus, to the conducting wire; the coated wire is then subjected to a heat of 300° Faht. for three hours. The heat may be applied by introducing a reel, that carries the wire, into a suitable heated chamber.

The conducting wire may be of copper, " and in order to prevent " the sulphur acting injuriously thereon it is desirable to first " coat the wire with tin, by depositing from a solution of that " metal."

[Printed, 3*d*.]

A.D. 1858, October 12.—N° 2270.

WRAY, Leonard.—" New and improved compounds for the " coating or insulating of submarine electric telegraph wires, and " which are also applicable to the coating or insulating of electric " telegraph wires laid underground."

The compounds set forth in this Specification consist, firstly, of a gum elastic or gum resinous substance, such as India-rubber; secondly, of a siliceous or aluminous material, such as powdered glass; thirdly, of " a suitable resinous substance," such as shellac. Such proportions of India-rubber, powdered glass, and shellac, are used " as are best suited to the purpose intended."

It is preferred to mix the above-mentioned ingredients by means of heated masticators or hot mixing rollers.

Instead of caoutchouc, "mineral caoutchouc (bitumen) or gutta " percha" may be used, and instead of powdered glass, powdered flint or kaolin may be used.

In one compound mentioned merely India-rubber and powdered glass are used, the shellac being left out.

Telegraph wires are covered with these compounds by any of the ordinary processes.

[Printed, 4*d*.]

A.D. 1858, October 12.—N° 2271.

SHAW, Thomas Cotterill, and COOPER, Frederic Henshaw.—" A new or improved construction and mode of working " engines by the agency of air or gases in conjunction with elec- " tricity for obtaining or producing motive power."

As an example, a locomotive engine, constructed according to this invention, is described in the Specification and shown in the Drawings. Condensed air is permitted to pass from a reservoir " in an intermittent stream to a reaction or other engine, which is " put into operation by the expansion and escape of the con- " densed air. On its passage from the reservoir to the engine, " the air is exposed to an electrical discharge, whereby the elastic " force of the air is much increased."

To produce the electric force an electro-dynamic apparatus with a secondary coil is worked by means of a hydro-electric machine. The introduction of water in a finely divided state through the jets against the conductor is accomplished by allowing a portion of the condensed air from the reservoir to pass through a chamber into which water is injected.

Either the disruptive discharge or the heating effects of the electric force may be employed to increase the elastic force of the air or gas used to work the engine.

The actions of the double-acting condensing pumps, " valves, " contact breaker, and other moving parts are effected from the " main shaft of the engine."

The arms of the reaction engine rest upon friction rollers, and are kept cool by means of water, which is admitted to the annular groove in which a rim attached to the arms revolves.

[Printed, 6*d*.]

A.D. 1858, October 16.—N° 2317.

NICKELS, BENJAMIN.—" Improvements in electric telegraphs."

This invention is applicable to submarine telegraphs, and consists in using an uninsulated conductor, the terminals of which are respectively connected to a copper and zinc plate immersed in the sea. The sea is thus made to form the fluid element of the battery employed for working the telegraph.

When it is required to transmit a current in one direction only, a receiving instrument is placed at the station to be communicated with, and has one of its terminals in contact with the end of the cable, the other terminal of the said receiving instrument is in permanent contact with the submerged copper plate. At the communicating station the submerged zinc plate is brought into contact with the end of the cable whenever it is desired to send a signal.

When the telegraph is required to signal in both directions, each station has a positive and negative submerged battery plate in connection with the signal instrument. The negative plate is constantly kept in the telegraphic circuit; by depressing a spring the positive plate is brought into circuit, and the negative plate at the same station is, at the same time, thrown out of circuit; a voltaic current is thus made to traverse the telegraphic circuit.

A cable of two wires may be used; one wire carries a zinc plate at each end, the other wire a copper plate at each end. Contact between the wires at either end of the circuit transmits a current.

Other details are set forth in the Specification.

[Printed, 7*d.*]

A.D. 1858, October 18.—N° 2321.

WEST, CHARLES.—" Improvements in the mode of insulating " and covering wire."

This invention consists in winding a flat strip of India-rubber round the wire or electric conductor helically, so as to have an overlap of about half the thickness of the strip. In passing from the supply reel to the wire, the strip is moistened with some solvent by means of a small roller. The folds of the India-rubber strips are thus caused to adhere together and an impervious covering to the wire is formed.

Another process for causing the cohesion of the strips consists

in plunging the covered wire into a heated solution. According to the heat required, the solution may consist either of pure water or of the aqueous solution of a salt that boils at a high temperature, such as common salt or alum. This process may be used alone or in conjunction with that described above.

To preserve one or more wires when placed in the interior of a cable, a covering of hemp saturated with a composition is used. The composition consists of a metallic carbonate or oxide mixed with a fixed oil, either alone or in conjunction with a volatile oil, " or saturated with (what I prefer) a solution of what is known " as Peacocks and Buchan's composition for ships' bottoms."

When many insulated wires are in a cable, they are laid into a rope which is surrounded with hemp saturated with the above-described composition. If the cable has only one wire, it is laid into a rope together with two or more strands of saturated hemp.

[Printed, 4d.]

A.D. 1858, October 18.—N° 2322.

TIDMAN, Robert.—(*Provisional Protection only.*) " Improve-" ments in machinery or apparatus for paying-out and for " raising electric telegraph cables."

This invention " consists in employing a raft or floating plat-" form for carrying and delivering electric telegraph cables when " paying them out, and for winding such cables upon, when it is " desired to raise them, and in connecting by chains or otherwise " to the said raft or platform a lighter raft, or a series of lighter " rafts or sea cradles, coupled by chains or otherwise, and " furnished with sets of horizontal rollers over which the cable " passes on its way to the sea. These lighter rafts are used only " when paying-out cables, being unnecessary when cables have to " be raised.

" The cable to be paid out has one end fastened to, and is then " coiled upon, the principal raft or platform, and then has a " casing built up over it. In the top of this casing rollers are " placed, between which the end of the cable passes out. This " end is then laid over the lighter rafts, rolling freely upon the " rollers of the same; guide rollers are placed at the sides and " across these lighter rafts to prevent the cable from leaving " them. The principal raft is towed by a steamer or by steamers, " and the cable runs freely out of the casing and over the roller

" rafts into the sea. The light rafts trailing behind the principal " raft, will readily sink to a certain extent, should any sudden or " great strain tend to come upon the cable, and the strain being " thus at once yielded to, the cable cannot by any possibility be " injured. To raise cables previously sunk it is only necessary to " fix a steam engine upon the principal raft, and wind the cable " up in the opposite manner to that in which cables are paid out " from the same."

[Printed, 8*d.*]

A.D. 1858, October 18.—N° 2326.

DRAYSON, ALFRED WILKS, and BINNEY, CHARLES RICHARD.—" Improvements in submarine telegraphic cables."

1st. " Enclosing electric conductors within elastic tubes made " of vulcanized india-rubber or other analogous material in such " a manner that the electric conductor and the elastic external " tube or covering may be free and independent of each other." A thick wire is covered with silk, which is secured on the wire by means of a solution of India-rubber. The wire, thus protected, is then enclosed in a tube or pipe of vulcanized India-rubber, " in " such a manner as to leave a vacant space of air round the " enclosed wire."

2nd. A combination " which will admit of electric conductors " being stretched or elongated without detriment thereto." It is proposed to introduce into the main cable at intervals, " say of " 50 or 100 miles," lengths of peculiarly constructed cable of from half a mile to a mile long. These lengths are made as follows :— " The electric wire or conductor is to be coated with a solution of " india-rubber, and insulated by means of a yarn of silk precisely " as in the former instance; but instead of the conductor being " laid in a perfectly straight line inside the vulcanized india- " rubber tube," it is proposed " to coil it in the form of a helix or " spiral."

[Printed, 6*d.*]

A.D. 1858, October 22.—N° 2363.

WALLER, RICHARD.—" Improvements in obtaining motive " power, and in apparatus connected therewith." The power is obtained by means of electro-magnetism.

In one modification of this invention, described in the Specifi-

cation and shown in the Drawings, an eccentric cylindrical keeper revolves or rolls in contact with a circle of horseshoe electro-magnets placed radially, the electro-magnets being fixed and the keeper rolling in contact with the magnets within the circle formed by the faces of the poles of the magnets. A suitable wheel commutator with springs and pins is described and shown. The magnets are excited seriatim.

In another arrangement, the electro-magnets are fixed against conical plates; a soft iron disc acts as a keeper and is placed between them. The oscillation of the disc, by the successive magnetization of the electro-magnets, gives continuous motion to the shaft or axle on which the disc is mounted.

The series of magnets may be arranged in the shape of a quadrant or sector, so as to produce a reciprocating motion.

The "improvements in batteries consist in giving a current or "stream to the liquid employed in the cells for cleansing and "other purposes, also in working the cells or troughs under "pressure, greater or less than that of the atmosphere."

[Printed, 7*d.*]

A.D. 1858, October 23.—N° 2368.

SHEPARD, Edward Clarence (*a communication*).—"Im-"provements in electric lamps."

In the electric lamp described in the Specification and shown in the Drawings, the carbon electrodes are kept at the proper distance apart by being forced up against bridge pieces respectively insulated from each other, the said bridge pieces having suitable apertures to admit of the advance of the points of the electrodes only as fast as they are reduced by the electric current.

The whole apparatus is held together by the wooden frame in which the above-mentioned bridge pieces are mounted. The electrodes work freely and centrically in small reservoirs of water fixed to the said frame. The tube of the upper electrode slides in a vertical tube through the centre of the upper reservoir, and is filled with mercury, in order that the point of the carbon pencil may be kept within the seat of the upper metallic bridge piece. An inverted syphon tube in the lower reservoir has one of its limbs concentric with the said reservoir and in a line with the upper electrode; it is nearly filled with mercury, which buoys up the lower electrode floated in it against the lower bridge piece.

In order to keep the carbon pencils pointed, if a galvanic current is used to work the lamp, its direction must be changed at at intervals by a pole changer; if a magneto-electric machine supplies the electric power no pole changer is necessary.

[Printed, 8d.]

A.D. 1858, October 23.—N° 2371.

MARTIN, JOHN COWDERY. — (*Provisional Protection only.*) " An improvement in the manufacture of metal moulds for " moulding plastic substances."

" My invention consists in making moulds composed of electro- " type copper strengthened by the addition of other metal, to " render them sufficiently strong to bear the necessary pressure " for producing the moulded article. The surface of the mould, " or that part which gives form to the article moulded, is to be of " copper, deposited, by means of the electrotype process, on a " model of wax, plaster of Paris, gutta percha, or other suitable " material. The thin copper surface so deposited is then placed " in an iron case or bed of suitable strength to bear pressure, " leaving a space between the iron bed and the copper of about a " quarter or three-eighths of an inch. A readily fusible metal or " alloy, as type metal, tin, and lead, or zinc (I prefer type metal), " is then poured between the two, the iron case or bed being pre- " viously heated to allow the metal to flow readily between it and " the copper surface, ridges or grooves being formed in the iron " to hold the whole securely together; but previous to pouring, " the surface of the copper next to the iron is to be tinned to " enable the metal poured against it to adhere; or the copper " surface previously tinned may be imbedded in zinc or other " readily fusible metal or alloy; but I prefer to use such metal or " alloy with the iron case or bed, as above."

[Printed, 3d.]

A.D. 1858, October 23.—N° 2373.

NEWTON, WILLIAM EDWARD (*a communication from M. G. Farmer*).—" Improvements in telegraphic apparatus."

1st. Sending and receiving messages "simultaneously over the " same wire." Each instrument has a relay, consisting of an " accessory magnet" worked by an "accessory battery," besides

the batteries and magnets belonging to the line-wire circuit, it has also a transmitting key which transmits signals by reversing the direction of the line-wire current; the said current circulates from the two line-wire batteries in a given direction when the instrument is not in action. On the depression of the transmitting key at the near station, the line-wire currents are caused to neutralize each other, the relay at the near station short circuits its recording instrument, and that at the remote station puts its recording instrument into action. Simultaneous depression of the keys at the near and at the remote stations, causes the line-wire currents to flow in the same direction, but reversed in relation to their normal direction, consequently each recording instrument is simultaneously put into action by its relay.

2nd. "A means of printing despatches as received." Two trains of wheels are used to work the mechanism of the printing machine; the "type-wheel train" runs continuously and the "printing train" only when the electric circuit is broken. The arm of a circuit wheel is constantly kept revolving by the type-wheel train. When the printing train is released by the depression of a key set apart for that purpose, the type wheel is made to revolve until it comes into such a position as to be able to print the letter whose key is depressed; the letter is then printed, and the printing train (at its next revolution) releases the type wheel.

The perfect action of this instrument, therefore, will be seen to depend upon the isochronous movements of the wheel trains and thence of the circuit-wheel arms at each station. Depressing the above-mentioned releasing key, by breaking the electric circuit in both instruments, causes the armatures of the electro-magnets to release the detents of the printing trains and to unlock the type wheels; the key of the letter to be signalled then being depressed, interrupts the circuit through a corresponding part of the circuit wheels, and thus enables that particular letter to be printed by the stoppage of the type wheels at the proper place at both stations.

A click and click-wheel arrangement enables the type-wheel train and the printing train of each instrument to revolve in unison. To make the movement of the type-wheel train uniform, a friction regulator is employed. To enable the movements of the instrument at one station to be isochronous with those of the instrument at the other station, an automatic adjustment is em-

ployed by which the type wheel is arrested at a pre-determined letter.

3rd. The union of the instruments, described in the 2nd part of the invention, with those which form the subject of the 1st part of the invention, so as to send and receive messages simultaneously over a single wire and to print the messages so received at either end. At each station there are two printing instruments (each actuated by its own local battery), a line-wire battery, an accessory battery, a relay and a transmitting key. The transmitting key, which sends the currents as set forth under the head of the 1st improvement, is actuated and controlled by an electro-magnet in the circuit of the battery of one of the printing machines, the magnet being constantly excited when the said printing machine is not in action. It is to be understood that in this arrangement one of the printing machines at a given station acts as a receiving, and the other as a transmitting instrument; the transmitting key is controlled by the transmitting instrument, and the relay controls the receiving instrument.

[Printed, 2*s.* 1*d.*]

A.D. 1858, October 27.—N° 2394.

WRAY, Leonard.—(*Provisional Protection only.*) "The pre- "paration and application of a substitute for gutta percha, caout- "chouc, and similar substances." This substitute is called "susu poko" and is recommended "as an insulating material "for submarine and other electric telegraph wires."

"Susu poco" ("tree milk") is obtained "from a tree which is "found growing on the Malayan peninsula and on the islands of "the Malayan and Eastern Archipelago." This naturally produced juice is a hydrocarbon "in some respects similar" to gutta percha, highly and very agreeably perfumed, and "possessed of "considerable elasticity when dry."

In the preparation of this crude natural product it is first freed from woody and other impurities by well-known methods; it may "be benefitted by compression," and hardened by means of chloride of sulphur; it may be had in solution by treating it "with naptha, bisulphuret of carbon, oil of sassafrass, and other "suitable solvents, also heat." Other methods and substances, "such as are used in the preparation of india-rubber & gutta

" percha " are employed in the preparation of this product. In some cases " susu poco " is mixed with gutta percha, caoutchouc, and other similar substances, " either one or more of them." " It " may also be combined with lac, shell-lac, with pulpy and with " fibrous matters, with siliceous, and indeed with a great number " of other substances."

[Printed, 3d.]

A.D. 1858, October 28.—N° 2409.

MUNRO, WILLIAM.—" A new manufacture of capsules and " other metallic articles " by means of electro-deposition.

The depositing solution consists of a solution of sulphate of tin; sheets of lead are electro-coated with tin to the thickness required, " and the combined metal may then be rolled " down to a suitable thinness by ordinary flatting rollers or other " suitable means. The sheets so produced may then be made " into capsules or other articles; or, capsules or other articles " previously made of lead may be coated with tin by putting such " capsules or other articles on the zinc wire " [of the galvanic arrangement?] " instead of the plate of lead."

To prepare the sulphate of tin solution, metallic tin is dissolved in muriatic acid, and the carbonate of tin precipitated therefrom by means of a solution of common soda. The carbonate of tin is then washed and suspended in water; the addition of a certain amount of sulphuric acid gives the solution of sulphate of tin which is used in this process.

[Printed, 3d.]

A.D. 1858, October 28.—N° 2411.

HALL, WALTER, and WELLS, ARTHUR.—" Improvements in " electric telegraph cables, and in machinery employed in the " manufacture thereof."

1st. " Insulating the conducting wire or wires." The wire is first covered with a helical layer of unbleached cotton, then with strips of bottle India-rubber laid on helically and with overlap, and, finally, with " a thread of vulcanized rubber covered with cotton, " or other like suitable fibre." All these coverings are put on at one operation and by one machine. Further coatings of bottle India-rubber, laid on alternately in opposite directions and en-

veloped by a similar covering of vulcanized India-rubber, may be applied as may be desired.

2nd. "Protecting insulated wire or wires." A covering of gutta percha may be first applied; this is surrounded with plain hemp or other fibre, braided or helically laid on. A coating of spun yarn, saturated with tar, is then braided, wrapped, or laid on, at one operation and by a machine similar to that mentioned in the 1st improvement. External protecting wires are, finally, laid on by means of a hollow-tube braiding machine, one set being laid longitudinally.

The helical covering machine consists of a number of bobbins mounted upon face plates with hollow axles; as the wire passes through these it is covered as described above with the proper sequence of coatings. A gauge for applying India-rubber solutions is also described and shown.

The chief characteristic of the hollow-tube braiding machine is that the telegraph wire passes through the hollow axle of the disc that carries the braiding bobbins, and that the longitudinal wires are supplied from fixed reels and pass through tubes connected with the braiding disc.

[Printed, 1s. 10d.]

A.D. 1858, October 29.—N° 2419.

ZANNI, Geminiano.—" Improvements in arranging magneto-" electric machines for medical and other purposes."

" This invention consists in combining magneto-electric ma-" chines with maintaining springs and wheelwork, so that when " they are required for use the spring being liberated causes the " armature of the machine to rotate, and so produces a succession " of currents or shocks in the circuit of which the wire coils sur-" rounding the armature form a part. It is evident that a weight " may be employed in place of a spring for actuating the armature " and coils, and in some cases the use of a weight is as advanta-" tageous as the use of a spring.

" Magneto-electric machines combined in this manner may be " employed conveniently for medical purposes, for working electric " telegraphs, and for other uses."

The axis of the armature is flattened where the conducting spring bears upon it; this acts as a break " to the metallic con-

"tact" and also allows the rotation of the armature to be stopped by the pressure of a screw against the above-mentioned conducting spring.

[Printed, 9d.]

A.D. 1858, November 1.—N° 2434.

MAYNARD, Edward.—The title of this invention is "Improve-" ments in submarine telegraph cables."

The inventor states:—"My invention consists in the use of " parallel cords or strings of flax, hemp, silk, or other non-con- " ducting fibrous material, in connection with one or more twisted " metallic conductors, whereby the strain in laying said cable is " taken by said parallel cords or strings, and the wire is free from " tension. To accomplish this object I use a strong cord of " fibrous material, and wind around the same a conductor con- " sisting of one or more wires. I then surround the same with " parallel strands or cords, and bind the same firmly around the " outside of the conductor by a serving wound around said " strands; two or more surrounding layers may be thus formed, " and if a second conductor is to be used, the same is to be " wound around the outside of the aforesaid layers of non-con- " ducting fibrous material, and then similar outer layers applied " outside of these fibrous layers; iron, or other wires, are to be " applied, either parallel or twisted. I prefer two layers composed " of fifty or sixty wires, more or less, twisted around said cable, " and then served or wound over with suitable material. Care " should be taken that the cords composing the alternate layers, " the wire of the conductors, and the wire coverings, be twisted " in opposite directions, so as to avoid any liability to twist or " kink. A saturation of wax is also to be used."

The Drawings show a single-wire cable consisting of ten different layers of material including the hempen core, and a double-wire cable consisting of fifteen different layers of material including the core.

[Printed, 6d.]

A.D. 1858, November 2.—N° 2439.

MENNONS, Marc Antoine François (*a communication*).— " An improved combination for the production of voltaic elec-

" tricity and its application as a curative agent to certain parts of " the human body."

"The invention consists in a voltaic arrangement composed of " zinc and copper wires twisted together or connected by other " suitable means according to the after form required.

" The voltaic couples thus composed are then worked into hair " nets, hair pins, circlets for the head, garters, etc., etc., to be " employed as direct distributors of the galvanic current to the " part affected."

The copper and zinc in these combinations may be respectively replaced by other suitable metals.

[Printed, 5*d*.]

A.D. 1858, November 2.—N° 2445.

BARCLAY, ANDREW.—(*Provisional Protection only.*) " Certain " improvements in electric, and magnetic, or electro-magnetic " telegraphs, aplicable to submarine and land communication."

"This invention relates to the arranging and worcking of electric, " magnetic, or electro-magnetic telegraphs by sea and land. " These improvements are, laying conducting wires of different " metals or of the same metal from both ends or poles of the " galvanic batteries, so as to complete the circuit direct, and if " thought proper, the said wires being made or not in one cable, " but so insulated that the one cannot touch the other, and " reversing the wires or poles of the batteries so as to give a " revers action to the current of electrecety. And in the case of " submarine telegraphs, taking adventage of the sea to form part " or whole of the batteries, by making the conducting wires of " differents metals, and in the case of the present Atlantic tele- " graph cable, or other submarine telegraph cables, making use " of the present outside covering wires as one of the said con- " ducting wires or generating battery. And making use of " possitive and nagative coiles to strangthen the current of elec- " tricity on said wires."

[Printed, 3*d*.]

A.D. 1858, November 4.—N° 2468.

BAGGS, ISHAM.—(*Provisional Protection only.*) " Improvements " in telegraphing by electricity."

1st. The employment of a fixed microscope or other optical instrument in combination with an indicating instrument. It is preferred to employ a voltameter as an indicating instrument, the negative pole giving off bubbles of hydrogen gas that are plainly and instantaneously visible when microscopic power is used. In the voltameter, instead of dilute sulphuric acid, a solution of any neutral salt in an infusion of litmus may be used; in this case the positive wire is instantly surrounded with a bright red tint.

2nd. "The generation of gas by electricity as aforesaid for " telegraph purposes, under a vacuum or partial vacuum, with or " without the application of the microscope, whereby the bubbles " of gas are made to expand to two or three hundred times their " ordinary size, and the indications are thus made more distinct."

3rd. "The application of photography conducted by any suit- " able means whatever, to impress upon paper, glass, or other " material the required telegraphic communications."

[Printed, 3d.]

A.D. 1858, November 5.—N° 2479.

PINHEY, Robert Eardley, and WOOD, John.—"Improve- " ments in apparatus for ascertaining the variation of ships' com- " passes for local errors."

" The bowl containing the compass card and needle is arranged " to fit into a ring of wood or other suitable material which is " mounted on gimbles. This ring has jointed to it an instrument " on the principle of a sun dial. This instrument we construct " in the form of a +, and the joint connecting it with the ring is " at its lower end; a time scale is graduated on the two sides of " the stem of the cross and also on the upper side of the two " arms, and the shadow is cast by one or other of the extremities " of the two arms or by the upper end of the stem, according " to the time of day at which the observation is made. The in- " strument is set by elevating the stem of the cross to an angle " corresponding with the complement of the latitude of the place " by means of a scale marked on the joint connecting the stem of " the cross with the ring, and by then turning the ring round " until the shadow falls on to the scale so as to mark the local " time of the place (as indicated by a watch correctly set by ob- " servation or otherwise); when this is done, the stem of the

"cross points along the meridian of the place, and a line formed "on the ring in the same direction (called the meridian line) then "corresponds in direction with this meridian, and the angle be- "tween it and the line forming the north and south points of the "compass is the variation and local error of the compass."

The compass card can be lifted off its pivot, and counterpoise weights maintain the ring in a horizontal position whatever be the elevation of the dial.

[Printed, 1s.]

A.D. 1858, November 9.—N° 2514.

NEWTON, Alfred Vincent.—(*Provisional Protection only.*) "Certain improvements in electric telegraphs."

The submarine, subaqueous, or subterranean conductor is not insulated but "is made to form a portion of the battery, used to "generate the electricity for setting the telegraph in operation, "the action being set up by the water surrounding the con- "ductor, or by the moisture contained in the surrounding earth." It is preferred to use Morse's instruments, "with a local battery "and relay magnet at each terminal station" in connection with this invention.

1st mode of working.—When two conducting wires (one of copper, the other of brass) are used through the whole length of the line, the wire of positive metal is connected with the anvil of each operating key and the copper wire with each relay magnet. Signals are transmitted towards the closed key when the key at one end of the line is closed and that at the other end open; in the normal condition of the instruments the keys are closed.

2nd mode of working.—Two similar wires and two large plates (at each end of the line), one of brass and the other of copper, may be used. The copper plates are connected with the relay magnet and with the anvil of the operating key at the same end of the line, and the zinc plates are connected with the key lever at the same end of the line; both keys are left open when no mes- sage is being sent.

3rd mode of working.—One wire, with two plates at each end of the line, may be used. The wire is connected with the relay magnets; either of the submerged plates may be brought into connection with the anvil of the key by means of a switch piece.

"Both copper plates are coupled with the keys," and both keys are closed when no message is being sent.

[Printed, 3d.]

A.D. 1858, November 9.—N° 2515.

BROOMAN, Richard Archibald (*a communication*).—"Improvements in electric telegraphs."

1st. "The so arranging of the battery force that electric currents can be transmitted to any required distance without limitation by the action of counter currents when the circuit is broken," the said counter currents being the effects of the Leyden-jar charge of a long or subaqeous conductor. The battery currents are so arranged "that the circuit is always closed, and never broken." The battery is divided into two or more groups, "one of which is at all times in perfect circuit," but without sufficient power to affect the receiving instrument; the other groups "are brought into circuit by means of the transmitting instrument, and act as recording currents."

2nd. Causing the transmitted currents to record a fac-simile of a written or printed message. The message is written in transfer ink of a good body, and is then transferred to the metal roll of the transmitting instrument. The transmitting instrument consists of the above-mentioned metal roll, which is made to revolve uniformly; a small roll at the end of a lever is electrically insulated from the larger one; the lateral motion of the fulcrum of the lever enables the electric contacts of the two rolls to correspond to the writing on the larger roll. The receiving instrument has a similar roll and lever arrangement, "except that the roll end of the lever is provided with a stylus on the roll end, and a soft iron armature at the other." The movements of the two instruments being isochronous, it is evident that the interruptions of the circuit by the transmitting instrument will be copied by the marks made by the "stylus" of the receiving instrument.

[Printed, 4d.]

A.D. 1858, November 17.—N° 2580.

HOGA, Stanislas, PIGGOTT, William Peter, and BEARDMORE, Septimus.—"Improvements in electric telegraphs."

The inventors "use the currents and reverse currents of elec-" tricity" which are produced "by placing in the earth or body " of natural water, near each of the stations between which " communication is to be made, three elements or metals, viz., " zinc, iron, and platinum (or such other substances as stand in " similar relation to each other) so that the first is positive to the " second, whilst the second is positive to the third." An insulated wire is used between the stations "for the return current."

"These elements or metals are not connected with each other " but are connected, each at pleasure, with the telegraph wire or " wires, and by the alternate action of the zinc and platinum, or " similar extreme positive and negative elements at one station " with the iron or similar element at the opposite station," signals are caused " by means of currents and reverse currents."

[Printed, 7*d*.]

A.D. 1858, November 17.—N° 2584.

TUCK, Joseph Henry. — " Improvements in the mode of " laying and securing telegraphic cables, and in apparatus for the " same, and for carrying on other operations under water."

This invention consists in a mode " of forming a channel to " receive the cable, and afterwards of securing it therein," also in the use of an apparatus for the purpose. Similar apparatus may be used for operations under water.

The apparatus for cutting channels consists of a carriage carrying a motive-power engine, rotary cutters, and clearing tools. The engine may either be a water or air engine which drives the said cutters and tools, also the front bearing wheels of the carriage. The hinder part of the carriage is jointed to the axle of the clearing tools, which axle also carries bearing wheels. The hinder part of the carriage contains " a wheel or a pair of wheels and a " segmental guide," by means of which the cable is laid in the channel as the carriage works forward. At the hinder end of the carriage is a platform on which a diving bell may be supported or on which divers may work.

The above-mentioned channel is to be formed smaller at the lower part than at the upper, and so as to be capable of supporting the covering of stones or other covering that may be thought suitable.

If preferred, the above-described apparatus may be contained within a diving bell.

[Printed, 7*d.*]

A.D. 1858, November 18.—N° 2601.

BRIGHT, SIR CHARLES TILSTON.—" Improvements in in" sulators, and an improved mode of connecting insulators to " posts and other supports."

In order to protect insulators from fracture, shields or protectors of wood, iron, leather, vulcanite, or other suitable material are fitted over or upon the glass or earthenware insulators.

To obviate the difficulties arising from the unyielding nature of the cement commonly used to connect the insulators to the posts or other supports, a slightly elastic medium or cement is used for the purpose, " such, for instance, as a compound of gutta percha " and pitch." The iron pin which carries the insulator may be wrapped with pitched hemp, or the insulator may be fitted upon a wooden stud.

Where the curves of the telegraph line are very sharp, a shackle insulator is used, attached to the support by an upright pin (covered with India-rubber tubing) that passes completely through the insulator.

Another method is to fix the insulators by straps to a pin upon the support, the straps being free to move upon the pin as a centre according to the direction of the wires attached to the insulators.

A shackle insulator with one strap is described and shown, this has a cover fitted to it which is kept in its horizontal position by a weight fixed to the under side of the strap. This insulator is convenient for terminating line wires.

N° 14,331 (Old Law) is referred to in this Specification.

[Printed, 6*d.*]

A.D. 1858, November 19.—N° 2616.

HANCOCK, WALTER.—" Improvements in the manufacture of " electric telegraph wires and cables."

1st. " The use, as an insulating material, in the place of gutta " percha, as ordinarily employed, of a compound composed of " gutta percha, or of india-rubber, or of an admixture of gutta

"percha and india-rubber combined with one or more of the "following substances, namely, shellac, resin, Venice turpentine, "or other similar non-conducting resinous or gum resinous sub- "stance." The ordinary masticating machine may be used for mixing, and the ordinary covering machine for coating, when the above-described composition is used.

2nd. The preparation of the conducting wire "by passing it "through a cement composed of asphalte or bitumen (preferring "in certain cases Trinidad bitumen), and Venice turpentine, "either with or without the addition of shellac, resin, or other "similar non-conducting resinous or gum-resinous substance." The said cement is applied simultaneously with the laying on of the coating of insulating material, by means of the ordinary apparatus fixed "immediately behind the 'die' of the ordinary "covering machine."

3rd. "The preparation of insulated wire about to be used in "the manufacture of a cable by passing it through a cement, as "herein before described, immediately prior to the laying upon it "of the strands or tapes of the rope or other cable or covering."

[Printed, 8*d*.]

A.D. 1858, November 19.—N° 2624.

LUEDEKE, Johan Ernst Fridrich.—(*Provisional Protection only*.) "Improvements in motive power engines."

"The power of magnetism" is employed to sustain a column of fluid in a chamber above its natural level. Steel magnets are used for this purpose; they are of the ordinary form, and supported "at a suitable elevation above the reservoir containing the "fluid, and with their poles within the chamber in which the "column of fluid is sustained."

In one arrangement the air has free ingress through a number of small openings in the lower part of the column of liquid, and "ascends thence in the column of fluid;" "by interposing the "buckets of a wheel in an inverted position (the whole being im- "mersed in the fluid) the air displaces the fluid in the buckets, "and so produces an ascending power which gives rotation to "the wheel. The air escapes freely from the buckets as they "rise to their highest position, and as they become inverted. "The poles of the magnets are immersed in the fluid, around

" which the chamber is open, and whereby the air has free escape " from the fluid."

In another arrangement a number of small cylinders of wood are mounted "on endless chains mounted on wheels, like a " Jacob's ladder; the one, & ascending part of the chains, is " in the column of fluid, while the descending part is in the " open air. The lower wheels are immersed in the vessel con- " taining fluid below the standing column, while the upper ones " are at a suitable elevation above it. The column of fluid is " sustained by magnets, as before, and the displacement of the " cylinders of wood in the column of fluid produces an ascending " power, and communicates motion to the chain wheels, from the " axis of which the power is derived."

[Printed, 3d.]

A.D. 1858, November 19.—N° 2626.

JOHNSON, John Henry (*a communication from Henry J. Rogers*).—" Improvements in the construction of electric telegraph " cables or conductors."

" It is proposed to dispense with the wire covering heretofore " employed, and to substitute for the same a covering composed " of hemp, thread, twine, cord, or other suitable fibrous material " to be plaited, braided, or interwoven by well-known machinery " over the gutta percha or other insulating medium, so that the " strands are woven together similar to those of a whip lash. One " or more of these plaited coverings may be employed, braided, " or plaited one over the other, and the whole may then be " covered with any marine paint or varnish adapted to the pur- " pose. This covering for conductors or cables will greatly re- " duce the weight and cost of submarine telegraph lines, protect " the insulating material and conductor from abrasion, and facili- " tate the process of laying the cable, whether at sea or under- " ground. For shoal water or anchorage ground, the foregoing " described cord should be encased in wires, which may also " be plaited or otherwise laid over the hemp or other fibrous " plaited material."

" The plaiting process may also be applied to the manufacture " of the electric conductor itself when several wires are to be used " in its formation."

[Printed, 3d.]

A.D. 1858, November 24.—N° 2670.

JOHNSON, JOHN HENRY (*a communication*).— (*Provisional Protection only.*) " Improvements in the employment of elec-" tricity as a motive power."

" This invention relates to a peculiar construction and arrange-" ment of machinery or apparatus for obtaining motive power by " the aid of electricity, and consists in the employment of a " number of permanent magnets so disposed that no two similar " poles shall face each other. Between these magnets are fitted " to play freely a number of soft iron electro-magnets of the " ordinary well-known construction, which will alternately be " attracted and repulsed by the permanent magnets by reversing " their polarity. The electro-magnets may be made to transmit " their motions by any convenient arrangement of mechanism " when a simple electro-magnetic motion will be obtained.

" In place of having moveable electro-magnets and fixed per-" manent magnets, the former may be stationary and the latter " moveable, and the electro-magnets may be employed only for " polarising the permanent magnets.

" It is also proposed to employ the electro-magnet in obtaining " induced electricity, which supplies wholly or partially the elec-" tricity necessary for polarising the electro-magnets, which elec-" tricity would otherwise be required to be obtained from batteries " or other known sources."

[Printed, 3*d*.]

A.D. 1858, November 25.—N° 2675.

LUIS, JOZÉ (*a communication from Serge Krotkoff*).—" A safe-" guard against burglars."

The breaking of the electric circuit by the entry of the burglar rings an electro-magnetic bell or alarum.

The alarum consists of a bell whose hammer is actuated by clockwork mechanism. When the electro-magnet acts upon its armature a detent lever presses against the fan of the clockwork and prevents the bell from ringing, but, on the liberation of the armature, the armature lever is altered in position by means of a counterbalance weight and the said armature lever then acts upon the detent lever and liberates the clockwork.

Wherever it is desired to have a protective arrangement, the

electric wires are led to, and at night are connected. During the day the action of the alarum is prevented by means of a bolt.

"The double safe guard apparatus" consists of two or more apparatus similar to that described above, connected together so that the raising of the armature in one, breaks the circuit or circuits of the others.

To indicate what precise part of a building is invaded, each portion has its own electo-magnetic arrangement, and a lid is raised from the box in the master's room, there being one lid to each electro-magnet.

An apparatus called a "mouse trap" consists of an iron grating, which is kept in its place above a door until the breakage of the circuit acts upon an electro-magnet and, by liberating wheel-work, enables a cam to alter its position.

[Printed, 10d.]

A.D. 1858, November 29.—N° 2714.

HANCOCK, Charles.—"Certain improvements in the insula-
"tion and manufacture of electric telegraph wires and cables."

Whenever the term "India-rubber" is used, it is intended to mean either India-rubber or a compound of India-rubber.

1st. The conducting wire is placed longitudinally between two strips of sheet India-rubber, and the strips are pressed closely together by grooved rollers or otherwise; previous to receiving the wire, the inner surfaces of the strips are coated with a solution of India-rubber. Instead of two strips, a single strip may be used to enclose the wire. Other coatings may be applied, so as to "break joint" with the previous coating.

2nd. Insulating telegraph wire by laying upon it, either helically or longitudinally, strips of waterproof fabric. When the strips are wound helically they are doubled to half their original width, and they are so laid upon the wire that the "raw edges" are perfectly covered by the succeeding layer; the fabric itself is thus completely enclosed and an exterior surface of India-rubber is alone exposed.

3rd. The above-mentioned or other insulated wires may be further insulated by covering and manufacturing them "into a
"cord or cable according to either of the plans herein-before
"described."

"The insulated wire or cable may be afterwards protected, if "necessary, by any of the means ordinarily employed for that "purpose."

[Printed, 4*d*.]

A.D. 1858, November 30.—N° 2732.

NEWTON, William Edward (*a communication*).—(*Provisional Protection only.*) "Improvements in telegraphing, and in "telegraphic apparatus."

A galvanic battery and induction coil are used in connection with the signal instrument. The signal instrument "consists of "two metallic points approaching but not meeting each other, on "opposite sides of a strip of paper on which the signals are to be "recorded. The paper is to be divided into equal spaces by "lines, and to be moved between the metallic points by clock-"work, so geared as to move the paper forward the distance of "one space at each beat or tick of the clock and no more, and a "single wire, either insulated or not, as the case may require, to "convey the electricity."

The battery is connected with the primary coil, and the secondary coil is placed in connection with the telegraphic circuit. "When a signal is to be given, the connection is to be made or "broken by pressing down a key," the resulting "current or "discharge" of electricity makes a small hole in the above-mentioned strip of paper. "As often as the key is pressed "down and released signals are passed and recorded with great "rapidity, accuracy, and distinctness. The strip of paper is to "be ruled with lines properly spaced, and the alphabet is to be "represented by the manner in which these holes or dots are "spaced, and the spacing is to be regulated by the beats or ticks "of the clockwork. The points are carefully insulated, and "placed in connection with the telegraphic wire."

[Printed, 3*d*.]

A.D. 1858, December 2.—N° 2756.

ROGERS, Joseph.—(*Provisional Protection only.*) "Improve-"ments in the manufacture of ropes, cables, cords, and lines." This invention is applicable to electrical purposes.

The materials used are "hemp, flax, jute, cotton, silk, or some "other fibrous material."

For electrical purposes the inventor covers "a core or cores of "wires, spirally twisted or laid straight, either insulated or not, "with a sufficient number of plaited or braided bands or spiral "cords, made of either of the above materials laid longitudinally, "so as to completely encircle the wire or wires," and he then forms the whole into a rope or cable, and binds it "tightly together by hitching, serving, whipping, or plaiting over with "wire, thread, cotton, silk, or other material suitable for the "purpose. These longitudinal bands are then to be saturated with "the mixture or composition hereafter described." This process may be repeated any number of times as may be desired.

"The composition or waterproofing material before mentioned "consists of a mixture of boiled oil, resin, patent dryers, tallow, "and pitch, tar, or dissolved india-rubber, or some of them, "thoroughly mixed, and boiled together. This material may be "applied either in a hot or cold state. The rope or cable is then "to be dried, and will be fit for use. The above composition, "when properly made and applied, will preserve and strengthen "the rope or cable, and resist the passage of water to the enclosed "wires."

A portion of this invention refers to making ropes, &c., for nautical, mechanical, mining, and agricultural purposes.

[Printed, 3d.]

A.D. 1858, December 4.—Nº 2773.

FLETCHER, LAWRENCE WOOD.—"Improvements in the con- "struction of electric telegraph cables."

1st. "Coiling or twisting the conducting wire or the strand of "conducting wires in contrary directions, so that when the elec- "tric telegraph cable is in a state of tension, the said wires may "be free to elongate to a greater extent than the covering wires."

2nd. "Weaving a covering of fibrous materials over the conduct- "ing wire or strand of conducting wires previously to insulating "such conducting wires by india-rubber, gutta percha, or other "suitable materials."

3rd. "Weaving a covering tube over the insulated wire or "wires; this woven covering may be made of wire warp and a

" binding weft of hemp or other fibrous material, or the warps
" may be of fibrous material with a binding weft of wire, or both
" warp and weft may be partly of wire and partly of fibrous ma-
" terials."

4th. " Covering the insulated core of electric telegraph cables
" with woven strips or bands of a combination of wire and fibrous
" material, saturated or coated over with india-rubber or other
" adhesive and suitable substance."

The Drawings show various adaptations and modifications of the above-mentioned improvements. In the woven covering, the warp threads are shown in some instances parallel to the cable, and in others laid in a diagonal or helical direction.

[Printed, 7*d.*]

A.D. 1858, December 4.—N° 2776.

SERVIER, Edouard Aristide.—" Improvements in pressure
" and fluid level indicators."

Electro-magnetic apparatus are used for showing the maximum and minimum values of levels and pressures at a distance.

The commutator for making the requisite electric contacts consists of insulated metallic contact pieces attached to the spindle of the float or other indicating apparatus; in juxtaposition to these contact pieces are other contact pieces " con-
" nected respectively by wires with a battery," and with the coil of a galvanometer or of an electro-magnet. The electric currents circulate, therefore, only when a maximum or minimum value is attained, and the deflection of the indicating needle of the galvanometer or electro-magnet is in one direction for the minimum value, and in the opposite direction for the maximum value, the direction of the electric current in the one case being opposite to its direction in the other case.

Another arrangement of commutator is described and shown that is applicable to a circular indicator instead of a vertical or straight indicator. The indicator needle is composed of two identical pieces of metal or needles insulated from one another. When these needles arrive in contact with certain metallic pins, the minimum value is attained, and the deflection of the galvanometer needle occurs in one direction; contact of the needles with

other pins deflects the galvanometer needle in the other direction, owing to the attainment of the maximum value.

Two electric bells, each giving a different sound, may be placed in circuit with the needle. These may either be worked by electro-magnets of their own or by the electro-magnets that deflect the needle.

[Printed, 11*d*.]

A.D. 1858, December 8.—N° 2818.

MEIDINGER, Henry.—" Improvements in electric batteries."

This invention "consists in arranging batteries on the principle " of Daniell's constant battery, in the manner herein-after de- " scribed, avoiding the use of a diaphragm, and protecting the " zinc from being too rapidly touched by the sulphate of copper. " For this purpose a large vessel of glass or of other suitable " substance is filled partly (say, two-thirds) with a diluted solution " of sulphate of zinc, and another glass of half the height and " diameter of the large vessel is placed within it, standing in the " solution; the second glass is covered on the inside with a " copper plate to serve as the negative pole of the battery, and a " copper wire is fixed to the plate. This wire is covered by a " small glass tube, so as to protect it from the liquid through " which it passes; the mouth of the exterior vessel is closed by a " cork, in which are two holes, one for holding a large and high " glass tube, the other for holding a strip of amalgamated zinc. " The former, closed at the lower end with a permeable fabric, is " plunged into the small glass, and kept full of sulphate of " copper; this forms a solution within the interior vessel, and " the negative pole is thus constantly kept in contact with a " solution of this salt. The zinc is immersed as far as possible " from the small glass into the zinc solution. The battery con- " structed in this manner serves for a long time, the sulphate of " copper never getting at the zinc."

[Printed, 5*d*.]

A.D. 1858, December 10.—N° 2835.

BARCLAY, Andrew.—(*Provisional Protection only.*) "Improve- " ments in electric-magnetic and electro-magnetic telegraph ropes " or conductors."

"This invention relates to the manufacture of electric-magnetic "and electro-magnetic telegraph ropes or conductors in such a "manner that the component wires of such ropes or cables are "twisted after the fashion of a common rope. The wires may be "separated from each other either by mechanically separative "matter only or by an insulating medium, or by both. In ropes "made in this way the strain is borne equally by all the wires. "Thus, the ropes or cables act in a superior manner as electric or "magnetic conductors from the fact that the wires are not in part "straight and in part twisted as in ordinary ropes or cables of the "kind. The same or a similar effect may be produced by plaiting "the wires or strands of the ropes, or forming them with regular "and uniform undulations. The wires of the cables may be "preserved by the electro-deposition of metal upon them, or by "metallic coatings of other kinds."

[Printed, 3d.]

A.D. 1858, December 10.—N° 2836.

BARCLAY, Andrew.—"Improvements in obtaining motive "power by means of electricity, magnetism, and electro-mag-"netism."

This invention "relates to the obtainment of motive power "upon what may be described as the galvanometrical principle."

In one machine a number of electro-magnets are fixed in a circular frame, radiating from the centre of the said frame. A similar number of radiating permanent or electro-magnets are also fixed to a central shaft, so as to be able to revolve between the sets of fixed radiating electro-magnets. Upon the application of alternating galvanic currents to the electro-magnets, motion is communicated to the permanent magnets, and thence to the shaft on which they are mounted. Instead of having the electro-magnets fixed and the permanent magnets moveable, the permanent magnets may be fixed and the electro-magnets moveable with the shaft.

In another machine a number of fixed radiating galvanometer coils act, by the alternate transmission of electric currents through them, upon a similar number of permanent magnets disposed radially (as galvanometer needles) upon a shaft passing transversely through the coils.

The above described apparatus may be enclosed in an air-tight chamber, from which the air may be exhausted or not.

[Printed, 11*d*.]

A.D. 1858, December 14.—N° 2864.

BROOMAN, RICHARD ARCHIBALD (*a communication from T. A. M. Sortais*).—"An improvement in transmitting electric "telegraph signals."

This invention consists in setting free the clockwork used in telegraphic recording instruments, "and bringing it into action "and stopping it by means of the current itself." "Not only is "the clockwork governed, but part of it is allowed to continue "in action for a certain time, and roll off a given length of paper "after the conclusion of a message or signal."

"As soon as the sending clerk acts upon the transmitting in-"strument so soon is the clockwork released at the receiving "station and kept in motion. The telegraphic signals cease as "soon as the transmitting instrument is not worked, but the "clockwork continues under the action of a spring to give off a "certain length of paper after the completion of the message or "despatch. Thus, without the intervention of manual aid a "separation is effected between consecutive messages or signals."

In one instance a Morse receiving instrument is described and shown, whose writing lever is connected with the clockwork by means of levers and a shaft that has a helical spring wound upon it. The stoppage to the clockwork upon the depressing of the writing lever occurring through the spring, the clockwork is not perfectly stopped until the tension of the spring is sufficient for that purpose.

Another arrangement consisting of a click and click wheel in combination with a tension spring, is also described and shown.

[Printed, 7*d*.]

A.D. 1858, December 16.—N° 2884.

SELWYN, JASPER HENRY.—"A novel apparatus for paying "out or laying down submarine telegraph cables or wires, and for "raising the same after they have been laid down."

"This invention or apparatus consists in the employment of "two or more separate water-tight cylinders or drums made of

" sheet iron, or of any other suitable material, and of such size " and shape as will allow of their floating in the water at about " half immersion when loaded with the intended quantity of cable " or telegraph wire for laying with paddle wheels, paddle boards, " or floats firmly fitted to the heads or ends of each cylinder, and " seperately set in appropriate towing frames, so that when towed " by a vessel, or otherwise moved through the water, the cylinder " or drum will be made to revolve on its axes by means of the " action of the water on the floats of the paddle wheels attached " to it."

The rate of revolution of the above-mentioned cylinders is proportioned to the speed of the towing vessel and "to the " circumference at which the paddle floats are set." The paddle floats are secured to the paddle wheels by means of screw radii; each screw radius passes through a screw collar in the centre of each paddle float. When a "clutch" is acted upon by ropes from the towing vessel, it comes within reach of the arms of capstan heads fixed upon the outer extremity of the screw arms or radii and turns the screws of the radii, thus causing the floats to approach to or recede from the central axis of the drum and regulating the speed of delivery of the cable.

In starting from mid-ocean the ends of the wire from each cylinder are joined, and each vessel proceeds in opposite directions at full speed, laying the wire behind it. In raising the cable the cylinder is towed in the reverse direction.

[Printed, 10*d*.]

A.D. 1858, December 16.—N° 2888.

MARÇAIS, Joseph Jean. — "Improvements in galvanic " batteries."

A single-fluid galvanic arrangement consists of the elements, amalgamated zinc, weak sulphuric acid, and carbon; when a powerful effect is required for a short time, bichromate of potash is added. The cell or trough is formed by covering two rectangular carbon plates on one side with gutta percha and, by means of a suitable mould, forming the remaining sides of the trough of gutta percha, so that a gutta percha trough, with carbon plates cemented to its flat sides, is obtained. When a number of these cells are required to act together, they may be made without

bottoms and immersed in a box containing the exciting liquid; the plates may be withdrawn from the liquid by a lever or other mechanical means, or the liquid itseif may be withdrawn from the box.

A double-fluid arrangement consists of amalgamated zinc, weak sulphuric acid, strong sulphuric acid, and carbon; strong nitric acid, or either of the acids together with bichromate of potash may be used to the carbon. The carbon is used in the form of a diaphragm, and it may be metallized. Sulphate of mercury may be added to the exciting liquid.

It is preferred to bake the carbon in a kiln composed of an air-tight fire-brick box to which the heat is applied in such a manner that "the carbon plates receive the direct action of the fire on "their broad surfaces and not so much on their sides."

When the above-described carbon plates are used only as battery plates they are preferred to be very porous, but when used as diaphragms also, they are not made so porous.

[Printed, 7*d.*]

A.D. 1858, December 16.—N° 2890.

BROOMAN, RICHARD ARCHIBALD (*a communication from Messieurs de Sauvigny*).—"An improvement in plating and gild-"ing forks, spoons, and other metal articles."

"According to the method usually followed in electro-plating "and gilding, a uniform coating is laid on every portion of the "article silvered or gilt. Now, in many articles which are sub-"jected to more wear at some parts than at others, as, for in-"stance, the prongs of forks, the bowls of spoons, &c., it is "desirable to obtain a thicker coating at those parts. In order "to effect this object I take any article, after having been uni-"formly coated by the aid of the galvanic bath, then heat it, and "by affinity of metal for metal solder on to those parts requiring "a thicker coating as many layers of leaf silver or gold as may "be necessary to produce the thickness desired. When a spoon, "fork, or other article is partially worn, without ungilding or "unsilvering the whole article, those parts only where the defects "exist need be covered. To cover an article which has been "previously coated by the ordinary galvanic bath in parts it is "heated to about 500° centigrade (932° Fahrenheit), silver or "gold leaf is then placed on the parts to be covered. The spoon,

" fork, or other article can be burnished with a brush, feather, " agate, or other usual burnishing tool."

[Printed, 3d.]

A.D. 1858, December 16.—N° 2891.

CLARK, WILLIAM (*a communication from Felix Marie Baudouin*).—" Improvements in submarine electric telegraph cables or " conductors."

" The use of electric cables or conductors, having considerable " flexibility and extensibility, in which the direct continuity of " the electric conductor is not interrupted by flexure or distension, by reason of the following peculiarities which may be " either used separately or in combination."

1st. " The use of a core formed of a flexible and extensible " material."

2nd. " The winding of a wire round the extensible core in contiguous spirals, forming a sort of spiral spring or helix."

3rd. " The superposing of second and third layers of similar " helices entering in the furrows of the first and second helices."

4th. When the metallic conductor thus formed round the extensible core is not required to be greatly extensible an analogous arrangement is employed, " but produced by a certain number of " wires wound on the extensible core in such way as to form a " combined wire helix, more or less lengthened."

5th. " The combination of this arrangement with the preceding, " by varying the form of the helix, and also varying according to " circumstances the kind of wires used."

6th. " The employment of the extensible core to form the " centre of the iron wire strands intended to protect the interior " of submarine electric cables, and to give them the elasticity " required."

[Printed, 5d.]

A.D. 1858, December 23.—N° 2937.

BARCLAY, ANDREW.—" Improvements in obtaining and distributing or applying electricity and magnetism, and in obtaining motive power therefrom."

1st. Obtaining electricity from the earth.

A compound metallic conductor, shapedlike a " bottle brush,"

called a "collector," is sunk in the earth, "so that each wire "point takes up a proportion of electricity, and the points as a "whole convey the electricity" "to the line wire or conductor." To keep the wires clean they may be immersed in a well containing a solution of sulphate of copper. "In the case of a telegra"phic cable, one of these arrangements is fitted up at each end, "one being the collector, and the other the distributor of the "electricity."

In a modification of this apparatus, "one arrangement of wires" is zinc, and the other copper.

2nd. Electro-magnetic machinery for obtaining motive power and applicable to telegraphic purposes. These machines are constructed upon "the galvanometrical principle" set forth in N° 2836 (A.D. 1858).

One apparatus, used for telegraphic purposes, consists of fixed radiating bar electro-magnets that act upon radiating permanent magnets so as to communicate a vibrating motion to the central axis carrying the said permanent magnets; the signals are made by an indicating needle fixed on the axis. "The stationary posi"tion of the index during a certain predetermined time" may be the means of conveying the telegraphic signal.

A motive power engine consists of fixed horseshoe electro-magnets placed radially and with the line joining their poles parallel to the shaft that carries the radiating permanent magnets.

[Printed, 8*d*.]

A.D. 1858, December 30.—N° 2984.

VION, Hippolyte Charles.—"A new mode of obtaining "atmospheric electricity and terrestrial electricity, and its indus"trial applications, and in apparatus for the same."

A fixed "terrestro-atmospheric pile" consists of positive branch wires fixed on mountains, and negative branch wires placed in the ground or in water. The upper ends of the positive branch wires are fixed to pointed electric conductors or collectors on the apex of the mountain; the lower ends are fixed to insulators from which conducting wires are taken to the place where the electrical effect is to be produced. The collectors of the negative branch wires are placed as deep as possible below the surface and consist of plates of non-oxidizable metal; the upper ends of the negative branch wires are connected with insulators near to those of the

positive branch wires, and the conducting wires are taken from the said branch wires to the place required.

A moveable apparatus consists of positive collectors and branches attached to an air balloon, and negative collectors and branches arranged in the same manner as those of the fixed apparatus.

This "terrestrial atmospheric pile or battery can be made ap-" plicable to lighting, heating, moving, telegraphying, decom-" posing and recomposing of bodies, and the like, that is to say, " this pile can be used as electric, magnetic, mecanic, chemical " power, &^{a}."

[Printed, 1*s.* 7*d.*]

A.D. 1858, December 30.—N° 2996.

KNOWELDEN, John, and EDWARDS, Richard Downes.—" Improvements in hydraulic engines, and apparatus connected " therewith," the said improvements being applicable (amongst other purposes) to lowering telegraph cables.

The engine is constructed with one or more cylinders having piston rods, valves, &c., and is actuated by water pressure from the mains of the streets or other sources; when desired, an air chamber may be added to the apparatus " for the purpose of " arresting, checking, or softening by means of a volume of " compressed air, any violent action produced by the sudden " stoppage of water, or by the weights to be stayed; this is " especially desirable in the lowering or hoisting of boats, ships, " anchors, telegraph cables, or other weights."

For motive power, three cylinders, with their piston rods actuating one crank shaft, are employed. The piston's length of stroke is regulated by the use of a slotted crank, so that the crank-pin may be moved to or from the centre of the crank shaft.

A peculiar slide valve is described and shown, in which a piston is connected with the valve by means of a rod; " the area of the " piston is less than the area of the valve, but the pressure on " the valve face is only proportionate to the difference of those " areas."

[Printed, 10*d.*]

A.D. 1858, December 30.—N° 2997.

DUNCAN, John Wallace.—This invention relates to electric telegraph conductors or cables.

1st. "Improvements for attaining greater efficiency and dura-"bility in electric telegraph conductors."

The centre copper wire in a telegraph cable is passed through an amalgam, an annealed copper ribbon (convolute in its cross section) is applied round the central wire, and the space between is filled with amalgam. Any number of metallic layers may be thus applied, Variations are stated when a compound central conductor is used. Different sections of covering wire may be used, and the encircling metal may be insulated or not.

A rod, surrounded by concentric cylinders of various metals, may be used as a conductor.

Metallic tape, woven of two or more different metals, may be used as a conductor.

2nd. Improvements in the insulation of electric telegraph conductors.

The above-mentioned tape conductor is charged with cement or hot thick viscid drying oil.

Textile fabrics, or prepared paper coated with metal foil, may be used for the purposes of insulation.

Insulating threads are saturated with linseed oil or other waterproof insulating matter.

Tapes of textile fabric, thicker in the middle than at the outside, may be used as convolute laminæ, having first been passed through thick hot linseed oil. A solution of India-rubber in bisulphide of carbon may be applied to the above-mentioned tapes.

Gutta percha, prepared as described in N° 13,738 (Old Law), compounded with drying oil, and applied at a very high heat to the conductor, forms an insulating coating. A tough solution of gutta percha, applied to the cable near the outside, is prepared by making a thick solution of gutta percha and shellac in bisulphide of carbon.

3rd. Improvements in the manufacture of electric telegraph conductors and in telegraph batteries.

Strong canvass may be sewn over a cable, a continuous longitudinal lip joint being used, for an outer protection to insulated cables. A vulcanized caoutchouc envelope may be used for a similar purpose.

Diagonal joints are used to join the lengths of metal strips used for sheathing telegraph conductors; the strips are united at their edges by means of hard solder.

Fibrous threads may be coated with cement, with cast-iron

borings, and then with metal; these, when insulated, may be used as conductors.

The covering cylinders of apparatus for covering wire are arranged in a horizontal line "with their orifices conveying to "the wire and superposed one above the other;" one or more coatings may thus be applied simultaneously.

The galvanic battery preferred to be used with the above-described cables is so constructed that its positive and negative plates rotate upon an axis.

4th. Utilizing invalid electric telegraph cables. The homologous lengths are separated where they have been united, and the end of the insulated conductor is introduced through a stuffing box in connection with a force pump. If the interstices are charged with water, sulphuric acid is forced along the interior of the cable; this is then displaced and the interstices are filled up with an amalgam. If the cable is required for deep water Canada balsam is introduced instead of the amalgam.

Inefficient cables "may be used for exhausting or forcing fluids "through."

5th. Improvements in testing insulated conductors. A force pump is used to endeavour to force fluid between the component parts of the insulated conductor. The construction of the conductor is imperfect if the said fluid penetrates these parts.

Another method of testing is by means of a "testing tube" with stuffing boxes at each end. A piece of the conductor is enclosed in the tube, and the tube is filled with any solution that may be thought desirable; air is then pumped into the tube until the requisite pressure is attained; while under pressure the conductor has maintained in it a negative or positive electric current.

In testing the quality of any insulating material, a conductor coated with the material is treated as described above.

6th. To prevent injury to an electric cable from a rocky bottom, corrugated sheathing is applied; the joint is made good by means of vulcanized India-rubber.

7th. "Anchoring submarine cables." "Two concave saucer "or bivalve-shaped shells" of metal or other suitable material are fixed to the cable at intervals.

N° 906 (A.D. 1853) is referred to in this Specification.

[Printed, 1s.]

1859.

A.D. 1859, January 4.—N° 31.

HIGHAM, Lindley John.—(*Provisional Protection only.*) The title of this invention is "Improved means for obtaining sub- "marine electrical conduction."

The inventor states:—"One of the great difficulties that has "hitherto attended the securing of submarine electrical conduc- "tion has arisen from the straining of the cable, and the conse- "quent displacement of the gutta percha or insulating coating; "to prevent this, I propose to employ as a protection to the "insulated wire a jointed case, in which the wire is to be placed, "and which is to form a permanent shield thereto. This pro- "tecting case I form of base plates or troughs of any given "length (suitable for winding round a barrel like the links of a "chain), and these I connect together by hinges or links in such "a manner that they will be capable of sustaining any given "strain during the paying-out operation, and over these plates or "troughs I place semi-tubular or other suitably shaped caps or "covers for securing the insulated medium within the jointed "casing. By this means it will be seen that I relieve the covered "conducting wires of all risk of injury during the submerging "process."

[Printed, 4d.]

A.D. 1859, January 7.—N° 56.

BARCLAY, Andrew.—(*Provisional Protection only.*) "Im- "provements in electric and magnetic telegraphs."

The electric cable is connected to an iron ship, or other metallic surface in the sea, "such connection being made by means of a "series of collecting or transmitting wires on the general principle "already explained" in the Provisional Specification of N° 2937 (A.D. 1858).

The signal instrument is on the "galvanometrical" principle, and is constructed with several wires. "The whole apparatus is "so arranged, that the sender of a message uses but one or a "portion of such wires for the transmission of his signals, whilst "the return current passes through a portion or the whole of the "wires, and the sender passes merely so much electricity through

" the galvanometer as suffices for the work to be done, whilst the " rest passes on."

The external as well as the internal wires of the cable are used for the transmission of signals.

One wire only may be used in the galvanometer, "the electricity " being divided off by several conducting wires so as to secure " the result herein-before referred to."

The quantity of electricity may be regulated by a rheostat, either of fluid or of wire, interposed in the telegraphic circuit.

One improvement relates to the use of a wire or cable for telegraphic purposes that is totally uninsulated, whatever protection there may be being a mechanical protection only, not electrical insulation.

[Printed, 4d.]

A.D. 1859, January 11.—N° 84.

HUGHES, DAVID EDWARD.—" An improved mode of insulating electrical conducting wires."

The inventor states:—" The chief object of this invention is " to maintain the insulation of submarine telegraphic wires even " after the gutta percha covering has become injured and no " longer able to protect the wires from contact with the water. " One mode by which I attain this end is to insert in the gutta " percha tube that encloses the conducting wires a semi-fluid " substance which, when the gutta percha coating is pierced or " cut, will ooze out and fill up the fissure, and thus restore or " maintain the insulation. Various semi-fluid substances may be " used, the preference being given to india-rubber combined with " oil, rosin dissolved in oil or turpentine, or such spirit or other " varnish as is not readily affected by changes of temperature. " Or in place of the semi-fluid substance, I use a rosin soap or its " equivalent, which when brought into contact with water by the " rupture of the gutta percha or other outer covering, will be " decomposed or dissolved by the water, and deposit a varnish or " cement which will close the fissure, and restore or maintain the " insulation.

" Instead of bringing this restorative medium in direct contact " with the enclosed wires, I may first cover the wires with a non- " conducting material, as gutta percha, and then apply a coating " of the semi-fluid or other restorative medium between this first " and a second covering of gutta percha. It will be understood

" that this invention applies to all wires that receive an insulating " coating."

[Printed, 4d.]

A.D. 1859, January 11.—N° 87.

SIEMENS, Charles William.—" Improvements in supports " for electric telegraphic line wires, and in tools or apparatus to " be used in the construction of such supports, part of which " improvements are applicable to the joining of pipes and other " articles."

1st. Telegraph posts. These posts are tripodal in form, and consist of three iron or steel rods or tubes, connected at the bottom to an extended base and united at the top to the piece of wood or iron that carries the insulators; at suitable heights lateral stays are placed. The joints of the upright rods with those at the base and with the lateral stays, are made by compressing a short leaden tube over the ends of the rods or stays; the tool for compressing the leaden tube consists of three dies, two of which work against fixed inclined surfaces. The upright rods are connected with the insulator carriers by means of a ring driven over them and over the carriers.

2nd. Telegraph insulators. An iron stalk is "cemented into " a porcelain or vitreous cup, which is cemented into an iron cup " or bell which carries the wire." The porcelain cup is made " without any shoulder or projection at the part where it is " cemented into the iron cup." The stalks are made of a bent form so as to bring them to the level of the point at which the wire is supported; they are secured either by screwing them into the posts or by means of nuts, or rings driven over the post and stalks may be used. The ends of the line wires may either be secured by means of a screw and nut on the iron cup of the insulator, or by means of a divided tube and ring; in either case the strain on the wires fixes them tighter.

[Printed 1s. 6d.]

A.D. 1859, January 12.—N° 96.

CANNING, Samuel, and CLIFFORD, Henry.—(*Provisional Protection only.*) " Improvements in machinery for paying-out " and for recovering or picking up submarine telegraph ropes, " cables, or chains."

"This machinery consists of one or more grooved pulleys or "rollers each having a jockey pulley or roller with levers working "into it;" these levers are raised or lowered "for the purpose of "regulating the speed in paying out or picking up cables, ropes, "or chains." Each grooved pulley has a brake wheel, or a friction roller may be fixed on the shaft of each grooved pulley. When a friction roller is used, an intermediate roller, capable of being raised or lowered, is arranged "so as to press down on the other "friction rollers, acting both as brake or friction rollers." In this apparatus the cable "passes through the machine in a "straight line," "and by releasing the the pressure of the jockey "pulleys" the cable is free from all friction of the machinery. The last pulley or stern wheel is carried on a moveable spring frame; any extra strain that comes upon the cable raises the jockey pulleys by means of levers connected with the moveable frame.

"The machinery for picking-up cables consists of the ordinary "winding drum and spur gear;" in addition to this the "grooved "roller and jockey pulley" is applied "to draw off the cable "from the drum as it is picked up." "The grooved pulleys or "rollers with jockey pulleys (without the drum)" may be used "as in paying-out cables, but in this instance they are geared "together."

[Printed, 4d.]

A.D. 1859, January 12.—N° 103.

BESLAY, CHARLES.—"Improvements in coating or covering "iron or steel with tin, zinc, or lead, or alloys of those metals by "electrical deposit."

This invention consists in using an electro-depositing solution that is entirely alkaline. The metal to be deposited is dissolved, by boiling, in a solution of caustic potash. "Waste scraps of tin "plate or other tinned or zinced iron" are introduced "into "the alkaline bath, placing them in a mass to form one pole of "the battery." "Instead of the waste scraps, lead, tin, zinc, or "alloys of those metals may be used and decomposed in the "alkaline baths, and the same applied to the coating of steel and "iron."

This invention may either be applied to give a "firm and "durable coating" to iron or steel, or it may be used "as a

" preparatory operation to the deposit of copper, silver, gold, or " other metals."

"For the purposes of the batteries used in depositing the " coating," the inventor employs "solutions of caustic soda or " potash, which dissolves the tin, lead, zinc, or alloy to form the " coating."

[Printed, 4d.]

A.D. 1859, January 13.—N° 119.

ROWLAND, Owen.—(*Provisional Protection only.*) The title of this invention is "Improvements in laying electric telegraph " wires in streets."

The inventor states:—"This invention has for its object im-" provements in laying electric telegraph wires in streets. For " this purpose I employ iron troughs furnished with covers " suitably constructed to form part of the pavement of a street; " these troughs are by preference laid end to end by the side of " the kerbstone of the street, and are fitted together with sockets, " and the covers drop into their places on the troughs when " the insulated wires have been laid within them. The covers " are locked after they have been laid on the troughs by sliding " them a short distance endways, when hooks with which they " are furnished pass under projections formed for them. In this " manner a continuous trough is formed, which can be laid open " from end to end if any defect should occur in the insulated " wires, without disturbing the pavement of the street."

[Printed, 4d.]

A.D. 1859, January 20.—N° 181.

CLARK, Josiah Latimer, and MUIRHEAD, John.—"Im-" provements in electric telegraphs, and in the apparatus used in " working the same."

1st. Constructing the horizontal portion of the iron supports of line-wire insulators of hollow malleable cast iron, "and sub-" sequently annealing the same."

2nd. Preserving gutta-percha-covered or India-rubber-covered telegraph wires from decay. Yarn or cord, made of fibres of spun glass and saturated with pitch, is wound or plaited on to the coated line wire, or on to a vulcanite tube which is slipped along the line wire.

3rd. Constructing station lightning conductors. A slab of slate having a number of holes in it, is laid on a flat iron face plate, a short pointed brass pin is dropped into each hole and has its point resting on the face plate. The pins are then cemented into their places by means of plaster of Paris, and are placed in metallic connection by pouring melted lead on to them. Suitable terminals are added for the connection of the line wires, and a piece of silk is placed between the pins and the face plate. A modification of this instrument is described.

4th. Test galvanometers. A galvanometer, that is wound with a long length of fine wire, has its terminals connected respectively with those of a galvanic battery, and with the ends of a short auxiliary coil of fine wire, thus providing two circuits for the electric current; as the relative proportion of the two quantities always remains constant, a measure of the whole quantity is obtained. The auxiliary coil is useful for reducing the strength of the "return current" in submarine cables. A test coil of exceedingly fine wire included in the circuit, enables the indications of the galvanometer to be kept constant. A horseshoe magnet for magnetizing telegraphic needles has a hinge at its bend, curved horns at its poles, and a spring that nearly separates the poles.

[Printed, 8*d*.]

A.D. 1859, January 25.—N° 228.

ANDREWS, William.—(*Provisional Protection only.*) "Im-" provements in electric telegraphs."

This invention relates to an intermediate receiving and transmitting relay, which is not interfered with by "the return or " induced currents" of submarine or subterranean telegraph lines.

The currents which actuate the receiving instruments at the two terminals of the line must always be in one direction.

Two balanced magnetic bars have each an electro-magnet under its poles. The coils of one electro-magnet are connected with the line-wire in one direction, and those of the other electro-magnet with the line wire in the opposite direction, so that each electro-magnet, and therefore each magnetic bar, is actuated by one line wire only. Each coil has an earth connection. When a line-wire current is sent through the relay, it magnetizes its own electro-

magnet, brings the relay battery into action, and breaks the connection of the forward line wire with the other coils; "otherwise "the battery current would pass through those coils to the "earth." "Immediately the original current ceases, the magnetic "bar displaced by it is drawn back by a spring to its former "position, and the relay battery circuit is broken, the return or "induced current of the relay battery now comes back by the "line wire to the relay instrument, and passes (by the connection "now re-made) to its electro-magnet coils, and thence to earth." The induced current, however, being in an opposite direction to the telegraphic currents does not move the magnetic bar. Other details are set forth.

[Printed, 4d.]

A.D. 1859, January 28.—N° 263.

BARCLAY, Andrew.—(*Provisional Protection only.*) "Improvements in obtaining and distributing or applying electricity "and magnetism."

Instead of connecting the receiving end of the telegraph wire to an arrangement of metallic surfaces, as set forth in N° 2937 (A.D. 1858), the said end of the wire is connected to other receiving apparatus composed of coke or other electric conductor "laid in the earth for the reception therefrom of the electricity." Thus the proper extent of the earth is connected, "to correspond "with the quantity of electricity to be given out" by the galvanic battery or other electric apparatus. To collect the greatest available quantity of electricity from the earth, a series of battery cells are suitably arranged "in concert." Electric cables may be kept positively or negatively charged, the transmission of signals being made by separate electric power.

In constructing galvanic batteries, a chamber is equally divided off by vertical porous divisions; these are filled, in alternate order, with the two exciting solutions, and the copper and zinc plates are similarly alternated throughout the series. The sulphate of copper or other ingredient is supplied from a shelf surrounding the chamber. In a modification of this arrangement porous cells are substituted for porous partitions.

Instead of laying down special cables or conductors, this invention consists of using rails of railways, lines of pipes, railings, and other continuous conducting lines to transmit electrical cur-

rents, this "mode of transmission being worked according to the "general non-insulating system" described in N° 2445 (A.D. 1858).

[Printed, 4d.]

A.D. 1859, February 4.—N° 316.

THOMPSON, Warren.—(*Provisional Protection only.*) "An "improved printing telegraph."

The manipulator consists of a finger board, whose keys are connected with certain pins of a horizontal wheel by means of levers. The horizontal pin-wheel is belonging to an ordinary clock train; whenever a key is acted upon by the operator, a corresponding pin is protruded from the circumference of the wheel, and the pin last protruded therefrom is pushed in; the latter movement actuates the instrument, which stops (until another key is acted on) when the protruded key arrives at "a fixed post."

The receptor, or receiving instrument, is put in motion by two clock trains, namely, the type-wheel train and the printing train. An escape wheel and ratchet wheel are fixed on the type-wheel axis, which is driven by a pinion attached to it by means of a spiral spring. The type wheel is attached to its axis by a coupling wheel which has a sliding motion, and contains thirty teeth. To bring forward a letter, "a little pin" hitches the type wheel to the coupling wheel, and, when the letter is printed, a spiral spring causes the type wheel to fly back and push aside an arm, "which prevents the coupling wheel falling until the type wheel "is entirely home." The ratchet wheel has also thirty teeth, and raises a lever which, when the wheel stops, falls back to its place, and thus allows an arm to make a revolution "sufficient to print "a letter by means of a cam wheel;" at the same time the band of paper is moved forward "by means of a Maltese cross," and the type wheel is unhitched by a lever which raises the coupling wheel.

[Printed, 4d.]

A.D. 1859, February 4.—N° 329.

BARCLAY, Andrew.—(*Provisional Protection only.*) "Im-"provements in electric, magnetic, or electro-magnetic telegraph "ropes or conductors, and in machinery or apparatus to be used "on board ship for laying or paying-out the same."

1st. Manufacturing telegraphic cables. Each wire or strand is covered with hemp, passed through melted pitch, and then through sand; squeezing rollers finally give consolidation to the coating. When made, the whole rope is passed through pitch and sand and then compressed. The hempen strands are wound upon the wires so as to cross the layers, and a layer of wax is superposed upon the above-mentioned coatings of each strand, so as to place a "non-conducting agent between each sanded strand." "The "conducting wires of the ropes may be separated from each other "and twisted in the rope."

2nd. Mechanical arrangements for paying out telegraphic cables. "After leaving the coil of rope in the ship's hold," the line of rope passes "over a series of upper and lower pulleys, the spindles "or centres of which pulleys are suspended from or connected to "the ship by caoutchouc, or other elastic material." "Instead "of arranging the pulleys as block tackles, that is, with the upper "and lower series upon one upper and one lower spindle, the "pulleys may be disposed in separate order, in upper and lower "rows, the rope being passed in a zig-zag direction over them."

"These ropes or cables are or may be covered with iron wire, "or wire of other metal, as an external protective coating."

[Printed, 4d.]

A.D. 1859, February 5.—N° 333.

TINKLER, Robert.—"Improvements in churns;" electro-plated valves are used in the said churns.

The churn described in the Specification and shown in the Drawings, consists of an ordinary barrel, supported at each end by spindles that work in bearings; the bearings are fixed to a suitable frame. The requisite rotary motion is imparted to the churn by means of a winch handle attached to one of the spindles.

To fix the churn in any required position for introducing the cream or extracting the butter, a bolt fixed to the framing is capable of engagement with any one of the holes in a segmental plate attached to the barrel. Access is obtained to the interior of the churn by means of a metallic bung, covered on its inner surface with vulcanized India-rubber; the metal portion of the bung "may be electro-plated, for the purpose of insuring greater "cleanliness and durability."

An "air discharge valve" is attached to the barrel; upon

depressing its cap by hand, the air escapes from the interior of the churn through lateral openings into the atmosphere. This valve consists of a conical lift valve attached to a guide spindle; the valve is kept up to its seat by means of a helical spring. "Both the "spring and all the parts of the valve and its details are electro-"plated, or protected by such a coating as will insure cleanliness "and lasting powers."

[Printed, 8*d.*]

A.D. 1859, February 8.—N° 352.

BAGNICKI, Doctor Ernest.—"An improved syringing ap-"paratus for curing leucorrhea and similar sexual diseases."

"It is proposed to employ a chair or other convenient seat "fitted below with a tank, which is divided into two chambers "by a very fine sieve placed vertically therein. Into one of "these chambers is poured the fluid to be injected, and in the "other is fitted the ordinary double-action force pump with "peculiarly constructed valve seats or chambers."

"The fluid filters through the sieve into the contiguous "chamber, and on working the pump is drawn therein and "forced by the aid of a suitable flexible injection pipe into the "womb, the waste fluid running into a separate receptacle and "being discharged therefrom by a cock for that purpose."

Metallic ball valves, with upper and lower seats, are used in the injection pump. On starting the pump "the several ball valves "are alternately lifted up to allow the fluid to pass, but as a "valve seat similar to the lower one is placed above each valve, "the upper passage is closed by the rising of the valve, when the "ball valve will fall again by its own gravity, upon the lower "seat to be again forced upwards by the fluid. This alternate "vibrating motion of the ball valves between their upper and lower "seats causes a species of electricity to be imparted to the fluid, "which electricity entering the body with the fluid produces the "curative effect desired. By increasing the number of vibrating "ball valves, the electricity may be increased to any desired "extent."

[Printed, 6*d.*]

A.D. 1859, February 15.—N° 423.

BEDSON, George.—The title of this invention is "Improve-"ments in joining wire for telegraphic and other purposes."

The inventor states:—" My invention consists, firstly, in
" placing the ends of the wires to be joined within a short tube,
" which I then strike with a punch or similar tool, or I use any
" description of pressure, so as to cause the wires and the tubes
" to be bound together. When this has been accomplished, the
" whole may, if desired, be protected by a coating with any sub-
" substance in use for such purpose. I prefer, however, to
" 'galvanize' the joints after the usual method, or otherwise to
" apply molten metal whereby the parts become soldered
" together, or I unite the wires by placing their ends in the
" tube and then apply solder without the compression above-
" mentioned. The wires thus joined are applicable for tele-
" graphic communications, and also to fencing, and other such
" purposes."

[Printed, 4d.]

A.D. 1859, February 16.—N° 434.

HORSTMANN, William H.—" Telegraphic cables, and the
" mode of constructing the same and laying them down."

1st. " Coating and combining the conducting wires so as to " render the insulation perfect." The wire is brightened, coated with gum lac, cloth, pitch, and cloth again, the coverings succeeding each other in the above order. If a second conducting wire is used, it is at this stage of the manufacture, coated as described above, and the two wires are bound together " by " winding a thread of fibrous material around them." One or more straight iron wires, coated with pitch, and bound to the the rest by a fibrous cord, is or are added to bear the strain to which the cable may be subjected.

2nd. A " new mode of constructing the cable while being laid." The apparatus necessary for coating the wire conductor, and for constructing the cable, is represented in the Drawings as being placed on the deck of the paying-out vessel. The wire is supplied from spools and passes through apparatus to effect the operations of brightening, coating with gum lac, heating, covering with cloth, with a mixture of resin and tar, and with fibrous material or gutta percha. A second coated wire is supplied and bound to the first, and iron wires are introduced and bound to the cable, as set forth under the head of the 1st improvement. In passing over the stern of the vessel, the cable enters a kettle of

melted tar and resin, and passes through an elastic opening at its bottom into the sea.

To connect the coils of wire, a swivel link is used, in which a conical head on the end of the wire enters a conical aperture in the link.

In paying out the cable certain buoys or floats are attached to it at suitable intervals; these consist of a hook suspended by a rope to the centre of a flat board.

[Printed, 10d.]

A.D. 1859, February 17.—N° 444.

SAILLARD, Benoit.—(*Provisional Protection only.*) "An im-"proved mode of obtaining printing plates from collodion "pictures."

A glass plate is covered with a film of collodion. Over this film is placed "the negative or positive of the drawing to be re-"produced;" the covered plate is then exposed to the action of light, and placed in a solution containing pyrogallic acid and nitrate of silver, to develope the picture. The photographic image is fixed either by means of a solution of hyposulphite of soda or of cyanide of potassium. The washed film is then covered with a saturated solution of bichloride of mercury, washed with a solution of bichromate of potash, then with distilled water, and dried; the design will then appear on the glass plate in relief. The design may then be coated with photographic varnish and submitted "to the electrotype process for the purpose of throwing "down copper or other metal thereon by electro-deposition." A reproduction is thus obtained "in metal suitable for yielding "impressions in ink of the raised picture or design produced "upon the glass."

[Printed, 4d.]

A.D. 1859, February 19.—N° 458.

DUJARDIN, Pierre Antoine Joseph.—"Improvements in "the printing apparatus of railway telegraphs."

1st. "An apparatus conveying and printing dispatches."

To the French railway dial telegraph transmitting apparatus, printing mechanism is added. The type wheel is fixed on the central vertical axle of the apparatus, and the paper is brought up to it, at the proper time, by means of levers worked from the

handle of the instrument merely by depressing it. The inking cylinder is kept against the type wheel by a spring, and the paper is moved forward (by means of a hook pulled back by helical springs and working in "a clockwork trundle") each time the handle returns to its original position. In this instrument the paper is in a vertical plane.

In a modification of this instrument, the type wheel rotates upon a horizontal axis, and the paper is in a horizontal plane.

2nd. "An apparatus receiving and printing dispatches."

The action of the electro-magnet of the instrument is to place the letter wheel suitably for printing; the operator then causes the letter to be printed. The electro-magnet vibrates an escapement rod that has a magnetic end; the operator depresses a lever, which causes the hammer to drop and the paper to progress for the impression of the next letter. The letter wheel is made like a stencil plate, and the hammer consists of a roller surrounded by an India-rubber ring.

A modification of this instrument is similar to that used on the French railways; the letter is also printed by a lever-handle worked by the operator.

The Provisional Specification only describes a receiving apparatus, worked by two clock trains, having a stencil-plate letter-wheel and suitable inking roller.

[Printed, 10*d.*]

A.D. 1859, February 25.—N° 512.

SIEMENS, CHARLES WILLIAM (*partly a communication from Werner Siemens*).—"Improvements in electric telegraphs and ap-"paratus, and in supports for electric telegraphic line wires."

1st. An electrical apparatus for releasing and stopping the clockwork of electric telegraphic apparatus. The armature-lever of an electro-magnet carries a detent or brake, which stops the fly shaft of the clockwork, if the electro-magnet has been inactive for a certain time; when the electro-magnet is active, the clockwork is released, and commences its motion, at the same time a small lever or "boot," suspended to the armature-lever, is raised out of contact with a slowly revolving wheel or disc of the clockwork apparatus; if, by the stoppage of the current, or otherwise, the armature-lever is caused to descend, the heel of the "boot" is in contact with the disc, and prevents the brake from stopping the

clockwork; as the disc revolves, it carries forward the "boot" until its toe only rests upon the said disc, which position allows of the complete descent of the armature-lever and of the stoppage of the clockwork. The "boot" may be made with conducting and non-conducting parts for making and breaking battery contacts, or contacts for transmitting instruments, or for discharging line wires before the clockwork is stopped. A vertical bar, risen up against the fly shaft by the disc, may be used instead of the "boot," but the "boot" is preferred. The signals may be marked in the manner set forth in N° 279 (A.D. 1858) by means of the above-described brake lever, or another electro-magnet and lever may be used for this purpose.

2nd. A receiving or recording instrument that marks the signals without the intervention of a relay. The chief peculiarity of this instrument consists in the employment of a permanent magnet in connection with the receiving electro-magnet, and with the soft iron bar that terminates the marking lever and that oscillates between the poles of the electro-magnet. By this arrangement, "the "poles of the electro-magnet form extensions of one pole of the permanent magnet, while the soft iron bar oscillating between them "forms an extension of the other pole of the permanent magnet." If the centre of motion of the bar is placed in a central position between the poles of the electro-magnet, alternating currents effect the printing or marking by means of the oscillations of the said bar from side to side, and when the bar is deflected to one side it remains there until the next current removes it to the other side. Dots, strokes, and spaces are thus efficiently made on the paper band of the instrument. If currents in one direction only are employed, the centre of motion of the iron bar is brought nearer to one pole of the electro-magnet, and the said bar is prevented passing the central position. The printing arrangements may be made according to the method set forth in N° 279 (A.D. 1858), or they may consist of an endless cord which passes round an inking roller; in the latter instance the inking roller is covered with inked cloth, and the paper receives the marks by being pressed against the cord. This receiving instrument may be combined with the "boot" apparatus to perform the functions set forth under the head of the 1st improvement.

3rd. A signalling instrument in which types are employed. Types, suitable to the alternations or breaks of the electric current necessary to produce the various signals, are put in proper order

into a rigid or flexible composing stick, or on to a cylinder, "so "that they can be moved onward and brought into contact with "springs, levers, discs, or other means of making contacts." When working long submarine lines, the signal strokes consist of two dots made close together; the extreme Leyden-jar charge of the line wire by long continued currents is thereby avoided. The perforated strips of paper described in N° 2366 (A.D. 1854) may be used in this signalling instrument.

4th. Magneto-electric machines. A number of horseshoe permanent magnets are fixed "with their similar poles one above the "other;" a soft iron bar, wound longitudinally with insulated wire, is mounted upon a vertical axis between the poles of the permanent magnets; alternating currents are induced in the coil of the iron bar, either by causing the said bar to oscillate or to revolve. Instead of winding the wire upon the oscillating bar, the coil may be fixed in trough-like extensions of the permanent magnets, and the bar may oscillate within the said coil. Another magneto-electric machine consists of an armature, moveable towards one pole of a permanent magnet by vibrating on an axis in connection with the other pole of the permanent magnet; several magnets may be used to one armature to increase the power of this machine. Another arrangement consists of a pair or several pairs of horseshoe magnets, each pair having its opposite poles connected by a piece of soft iron, and the remaining opposite poles free to act by induction upon the oscillating armature; the opposite poles that are connected by means of the soft iron piece belong to two separate magnets.

5th. "Improvements in supports for electric telegraphic line "wires." A post insulator of the construction described in N° 87 (A.D. 1859), has an iron stalk cemented into its vitreous cup; a bent plate of iron with a hole its upper part is slipped on to the stalk, and a nut is screwed upon the stalk; the line wire is firmly gripped between the lower part of the bent plate and the end of the stalk. The flange of the cast-iron bell fits against the side of the cylindrical post, resting upon a small flange between two ribs; the said bell is fixed to the post by a suitable ring made in halves or in one piece. Instead of the above-mentioned stalk, a hooked stalk having a saw cut in the bend may be used; the line wire is laid in the hook and secured therein by a cotter or key driven into the saw cut. In three-legged posts, similar to those set forth in N° 87 (A.D. 1859), a plate of cast iron is fixed to the lower end

of each leg, the upper ends of the main rods are pressed by a hoop into angular grooves, and the stays are radial and made in one piece.

In the Provisional Specification, N° 459 (A.D. 1854) is alluded to, and certain wings or tubes are mentioned that sweep away the spiders' webs from the insulator in consequence of their rotation or agitation by the wind.

[Printed, 2*s*. 8*d*.]

A.D. 1859, March 8.—N° 607.

CLARK, William (*a communication from Auguste Hubert Stanislas Treve*).—(*Provisional Protection only.*) "Improvements "in submarine telegraph cables."

"This invention has for its object to obviate some of the effects "produced by electricity in submarine cables, and which often "interrupt the regular passage of the current.

"In effect, it has been remarked that a cable after being used "a length of time becomes charged with electricity, and becomes, "so to speak, an immense Leyden jar. After much experience it "has been found, that if a copper wire is wound spirally round "the cable, and one of the extremities of this wire placed in com-"munication with one pole of the pile, and the other extremity "with the ground, such charging of the cable is prevented; it "also conduces to the intensity of the current which would be in "power nearly doubled, and in which application the invention "consists."

[Printed, 4*d*.]

A.D. 1859, March 12.—N° 639.

MAC NAB, James.—The title of this invention is "Improve-"ments in telegraphing or signalling apparatus."

"This invention relates to the working of telegraphic apparatus "of various kinds, and thereby transmitting signals by means of "a line or lines of atmospheric or hydrostatic tubes, such line of "tubing or pipes being the actual means of communication "between the distant points to and from which telegraphic "signals are to be sent and received."

The following apparatus are described in the Specification and shown in the Drawings, which act by pressure communicated to the fluid contents of the line of pipes, namely:—

An atmospheric telegraphing apparatus in which the signals are shown in a vertical column by the action of compressed air upon a column of mercury.

An atmospheric telegraphing apparatus similar to that above mentioned, except that the signals are shown on a circular disc.

An atmospheric telegraph in which the signals are indicated, by means of an index moving up and down a vertical column, by the action of air alone.

An atmospheric printing telegraph.

A pneumatic apparatus for giving audible signals.

" The signals of *electric telegraphic apparatus* may also be " conveyed by means of a suitable fluid through hydrostatic non- " conducting tubing, arranged for the purpose and in lieu of the " ordinary wire connections." This portion of the invention is not set forth in the Provisional Specification.

[Printed, 8*d.*]

A.D. 1859, March 15.—N° 653.

CLARK, WILLIAM (*a communication from Victor Louis Marie Serrin*).—" Improvements in the apparatus of electric lamps or " lights."

One electric lamp, described in the Specification and shown in the Drawings, consists of electro-magnetic arrangements in connection with clockwork, by means of which the distance between the electrodes is regulated according to the amount of electricity passing through the instrument. In this instrument the light is maintained in one uniform position, both the electrodes being acted upon by the regulating apparatus in the relative proportion that they burn away. The electrodes are each moveable vertically, the upper one being weighted and connected to a train of wheelwork by a chain passing over a large pulley, and the lower electrode being connected with the same train of wheelwork by a chain passing over a small pulley. The effect of this arrangement is that when the wheelwork is free, the electrodes approach each other at a rate proportioned to the sizes of their respective pulleys. To liberate and to stop this clockwork arrangement at the proper times, the above-mentioned electro-magnet acts (by means of its soft-iron armature) upon a series of levers called " an oscillating " system "; when the armature is strongly attracted, the frame of the " oscillating system " is drawn down, a catch is inserted in a ratchet wheel of the clock train, and all action is stopped until

the gradual burning away of the electrodes causes the reaction spring of the "oscillating frame" to overcome the attractive force of the electro-magnet and to set free the clockwork by removing the click. The clockwork being set free the electrodes approach each other as above indicated and thus can always be preserved at a given distance from each other within certain limits. An arrangement of levers, in connection with the "oscillating frame," is also shown, by which, at first starting the lamp, or whenever the carbons come into contact, the lower one receives an axial motion which overcomes the tendency of the carbon points to adhere together. A "compensating chain" is raised from a pendulous position at the same time as the lower carbon rises and thus compensates for the loss of weight which the carbon has sustained.

Another electric lamp, not explicitly mentioned in the Provisional Specification, has the same general features as the above-described instrument, but differs from it in some details. The upper electrode is connected to the clockwork by a rack and toothed wheel instead of by a chain and pulley. In this instrument a detent on the "oscillating frame" acts upon a fly connected with the clockwork, and the torsion apparatus connected with the lower electrode is dispensed with.

The applications of this invention are set forth in detail.

[Printed, 10*d.*]

A.D. 1859, March 18.—N° 687.

MOLESWORTH, John (*a communication from Frederick Newton Gisborne and Francis O. J. Smith*).—(*Provisional Protection only.*) This invention is entitled "An improvement in tele-"graphic communication."

In this invention all "artificial insulation" is dispensed with, an entire metallic conducting circuit being employed. Each station, included in the circuit, has a lever key, a generator of electric force, and an indicating or recording instrument. The lever key is so connected with the main circuit, with the source of electric power, and with the recording instrument, that—in its normal condition—the metallic circuit is complete; when the key is depressed at any station, it breaks the metallic circuit at that station, and inserts its generator of electric power. The electric current, thus allowed to circulate, acts upon all the indicating

instruments in the circuit, and transmits the signals from its station to all the stations in the circuit.

The law upon which this improvement depends, is, "that a cur-"rent will not leave a superior conductor, whatever may be its "length, for an inferior one of shorter length, to an extent that "will interrupt its use for telegraphic purposes."

[Printed, 4d.]

A.D. 1859, March 21.—N° 716.

WARNE, WILLIAM, FANSHAWE, JOHN AMERICUS, JAQUES, JAMES ARCHIBALD, and GALPIN, THOMAS.—(*Provisional Protection only.*) "An improved compound or pre-"paration of materials for and mode of covering and insula-"ting wires or conductors used for telegraphic or electrical "purposes."

The compound contains caoutchouc or gutta percha, or both combined, animal or vegetable oils, and bituminous and earthy substances. The caoutchouc or gutta percha and bituminous matter are dissolved in the same solvent. Animal or vegetable oils may be used as the solvent, or the said materials may be ground up with them; during this operation the earthy substances may be added. The whole of these materials having become intimately mixed, and in a plastic state, the telegraphic wires are covered with them by being passed through a vessel from which the compound is expressed through dies. The wires may also be coated by being passed through grooved rollers, and may receive any number of coatings that may be desired. The conductor, thus insulated, is then enclosed within an outer covering of fibrous material, which is saturated with a bituminous substance; on this adhesive surface "is to be dusted a coating of "pulverized glass or flints." "By passing the fabric, so coated "with glass between rollers, the siliceous particles will be forced "into the fabric, and will form a vitreous non-conducting "covering with which the electric conductor is to be covered as "aforesaid."

[Printed, 4d.]

A.D. 1859, March 25.—N° 755.

COWPER, CHARLES (*a communication from Robert Jefferson Bingham*).—(*Provisional Protection only.*) "Improvements in "telegraphic cables."

The principle of this invention is "the application of a compo-"sition of low specific gravity to counteract the weight of the "other materials of the cable."

The gutta-percha-covered copper wire is coated with a mixture composed of caoutchouc, gum lac, tar, and powdered cork or sawdust, "in such proportions that the cable shall remain sufficiently "flexible, and but slightly heavier than the water in which it is "immersed; gutta percha may be mixed with or substituted for "the caoutchouc."

By coating the wire with the above-named composition "on "board ship immediately before the paying out of the cable," the thickness of the coating may be varied according to the requirements of the case. If the cable is provided with metallic or other strengthening material, a thicker coating of composition is applied to it.

The composition used for the shore ends of the cable is the same as that described above, excepting that the cork or sawdust is replaced "by emery, corundum, silex, or some other similar "hard substance."

The copper conducting wire used in this cable is somewhat "thicker than those usually employed for telegraphic cables."

[Printed, 4d.]

A.D. 1859, March 29.—N° 785.

SEARLE, Richard.—"Improvements in apparatus used for "transmitting signals by electricity for telegraphic purposes, and "in the construction of telegraphic cables."

1st. The core or foundation of a telegraphic cable is formed "of bamboo or rattan canes joined together, so as to form a "support of the required length." The conducting wire may either be laid in longitudinal grooves in the canes, or it may be passed through them. The cable so formed is then served "with "caoutchouc or india-rubber, or vulcanized india-rubber."

2nd. Forming "the wire, ribbon, or other conducting medium "into a spiral form, which spiral is wound round, or otherwise "placed in or upon a core or foundation of bamboo or rattan "cane, or other substance, by which means, although the length "of the conducting medium is increased, the danger of fracture "or other injury from extreme strain or tension is greatly reduced "or altogether obviated."

3rd. "Increasing the surface of the conducting medium, by "using thin metallic bands or ribbons, or grooved or corrugated "wire, as a conducting medium." The said wire is grooved or corrugated longitudinally.

[Printed, 4*d.*]

A.D. 1859, March 31.—N° 810.

MORTON, Francis.—The title of this invention is "Improve-"ments in the construction of fences, and the posts or pillars for "the same, parts of which improvements are also applicable to "the construction of gate posts, or poles for telegraph purposes, "or for signal posts."

1st. Certain winding apparatus, more particularly adapted to strain the cords or wires of strained fences, and to keep them tightly strained. The ends of the wires are secured to rollers which are free to rotate; a click on the post takes into ratchet teeth cast on the roller; whenever the wires become slack a handle applied to the roller axes rotates the click wheels and tightens the wires.

2nd. "A novel mode of constructing the posts, pillars, or sup-"ports of strained or other fences." The intermediate posts are made of thin sheet iron, hollowed out or made concave, or a strip of wood may be placed between two thin plates of metal, and the whole bolted together; the feet of these posts are formed by fixing to metal flanges on the lower parts of the posts, certain flat or concave, vertical or diagonal plates. The straining posts are of metal; their feet are "constructed with vertical flanges or ribs, "which will form a cross in horizontal section."

[Printed, 1*s.* 4*d.*]

A Disclaimer and Memorandum of Alteration (numbered N° 810*) was filed on July 4th, 1861, by the aforesaid Francis Morton, in which the title of the above invention was altered "by "striking out the words 'fences and,' and also the words 'the "'same,' and introducing in place of the latter words, the word "*fences.*" In disclaiming the 1st part of the said invention, the inventor states, "I disclaim any right to the winding apparatus "when considered separately and apart from the peculiar con-"structions of posts herein described."

[Printed, 4*d.*]

A.D. 1859, April 4.—N° 837.

KIRKMAN, CHARLES FELTON.—(*Provisional Protection only.*)
"Protecting telegraph wires, and in useing them for subterranean and submarine purposes."

This invention "consists in placing the wires covered with "gutta percha or other simple or compound substance within a "network, plaiting, or braiding of cocoa-nut fibre, either with or "without the exterior service of small wires."

[Printed, 4*d.*]

A.D. 1859, April 6.—N° 863.

ROGERS, JOSEPH, and TWEED, EDWARD JOHNSON.—The title of this invention is "Improvements in coating conducting "wires used for electric telegraphic purposes."

The inventors describe the manner of performing this invention as follows:—"The conductors of wire to be used for electric "telegraphic purposes having been coated with gutta percha, or "with other suitable insulating matter or compound as is well "understood, it is preferred to bind the same spirally around with "yarn or tapes, or strips of felt, or of cotton or other fibrous "matter, which binding, however, forms no part of our invention, "and may be omitted. Over the insulated conductor or con"ductors a series of longitudinal bands of braided or plaited "hemp, or other fibrous materials, or it may be cords, threads, "or yarns, of like fibrous materials, are applied side by side in "such manner as to cover the exterior surface of the insulated "conductor or conductors, which, by preference, are bound round "with yarn, or cord, or wire (covered or uncovered), spirally in "one or two directions, so as to retain the longitudinal bands, or "cords, or yarns, in their places; but this binding may be "omitted, and then a coating of wires is applied by braiding or "plaiting, such wires having been first coated or covered with "hemp, flax, or other fibrous material, by winding or otherwise "surrounding them with yarns or threads, or other preparation "of such fibres. When using binding wires over longitudinal "bands, or cords, or yarns, it is preferred to serve the same over "or around with hemp or other yarn or strips of fibrous material "before applying the outer coating of braiding, whether of wire "or other material."

[Printed, 6*d.*]

A.D. 1859, April 8.—N° 881.

HOOPER, William.—"Improvements in insulating and pro-"tecting telegraphic conductors."

1st. Producing on an India-rubber-coated conducting wire "a "further coating or coatings, consisting of vulcanized india-"rubber, or a coating of india-rubber rendered into what is known "as a hard compound of india-rubber, there being interposed "between the inner insulating coating of india-rubber and the "protecting or outer coating of vulcanized india-rubber or hard "compound of india rubber a layer or coating of metal or other "isolating or separating material, with a view to prevent as much "as may be any action of the sulphur in the outer coating acting "upon the inner insulating coating of india-rubber which is not "combined with sulphur." The coating of metal foil may be given by lapping narrow strips thereof around the India-rubber coating, or a varnish composed of collodion and shellac may be used instead of the metal covering. The vulcanized India-rubber coating is given by covering the separating coating with a mixture of India-rubber with a compound of sulphur, and heating the wire so covered to the proper temperature.

2nd. Combining an outer coating of vulcanized India-rubber with an inner coating of gutta percha. To prevent the heat used in the process of vulcanization from getting to the gutta percha, either a thicker coating of isolating material may be used, or Parkes' converting process may be employed, and the coated conductor passed slowly through a bath of melted sulphur.

Metal conductors, insulated by the above-described means, may be coated with asphalt varnish and strands of wires in the ordinary way, the strands of wires being applied before subjecting the India-rubber compound to heat.

[Printed, 4*d*.]

A.D. 1859, April 8.—N° 884.

NEWTON, William Edward (*a communication from Mr. A. Wilson*).—"Improvements in telegraphing and in telegraphic "apparatus."

The transmitting apparatus consists of a galvanic battery in connection with a Ritchie's or Ruhmkorff's induction coil and a

transmitting key. The recording apparatus consists of a strip of divided paper moved by clockwork between two metallic points.

The battery poles are placed in contact with the primary coil of the induction apparatus, and the poles of the secondary coil are connected to the telegraphic circuit. When the transmitting key is pressed down, a "discharge of electricity is made along the "telegraphic wire and across the two metal points and through "the strips of paper, making a small hole, which is a recorded "signal. As often as the key is pressed down and released, signals "are passed and recorded with great rapidity, accuracy, and dis-"tinctness. The strip of paper is to be ruled with lines properly "spaced, and the alphabet is to be represented by the manner in "which these holes or dots are spaced; and the spacing is to be "regulated by the beats or ticks of the clockwork. The points "are carefully insulated, and placed in connection with the tele-"graphic wire."

[Printed, 8*d*.]

A.D. 1859 April 14.—N° 942.

SINNOCK, WILLIAM.—" Improvements in submarine and sub-"terranean electric telegraph cables, and in machinery for the "manufacture thereof."

The electric conductor, either insulated in the ordinary manner or uninsulated, has layers of fibrous material applied "spirally, lon-"gitudinally, or otherwise," round it. These layers are completely saturated with an insulating compound of India-rubber, gutta percha, and bitumen, and the laying is effected mechanically in the ordinary manner. An outer casing of fibrous material is then woven round the cable, the warp yarns running in a longitudinal direction and the weft yarn passing helically round the said cable. Just before they are applied round the conductor, the fibrous materials composing the warp and weft threads are passed through a heated mixture of India-rubber, gutta percha, and bitumen.

In the circular weaving machine described in the Provisional Specification, a semi-circular shuttle is used, and the depressing of the warp is effected by the arms of a planet wheel. In the circular weaving machine described in the Complete Specification, a bobbin acts as a shuttle, and a cam wheel raises or depresses the warp threads.

[Printed, 8*d*.]

A.D. 1859, April 14.—N° 943.

M^cDOUGALL, ALEXANDER.—" Improvements in coating me-
" tallic surfaces," applicable (amongst other uses) to "the coating
" of telegraph wires."

This invention relates more particularly to a method of covering the surfaces of metallic pipes with a composition containing sulphur, pitch, and bees-wax, "but the invention may also be " applied for coating other metallic surfaces."

The sulphur is first dissolved in the heavy oil of tar or other solvent, and the pitch and bees-wax are then added.

Metallic surfaces, generally, are coated with this compound by the immersion of the heated metal in a heated bath of the mixture. The material is applied to the interior of lead pipes during the operation of making the said pipes.

" The coating of telegraph wires and other metallic surfaces is " also effected by passing the heated metal through a bath of " the melted bituminious preparation as will be well understood."

The Provisional Specification does not state the applicability of this invention to the coating of telegraph wires, nor does it mention the use of bees-wax in the composition.

[Printed, 4d.]

A.D. 1859, April 15.—N° 951.

SILVER, HUGH ADAMS.—" Improvements in insulating wire for " electric telegraphs."

" The conducting wires are wound round with strips of india-" rubber applied in one or more layers, and then subjected to the " action of steam or heated vapour, or heated air, by which the " edges of the india-rubber become joined or cemented together, " and a complete coating of india rubber is obtained to the con-" ducting wire or wires. In some cases, the conducting wire or " wires having been wound round with one or more layers of " india-rubber, the coated wire is subjected to the action of a " melted sulphur bath, and this process may also be resorted to " after the india-rubber covering has been subjected to the action " of a bath of steam, or of hot vapour, or of hot air. And in some " cases the wire when coated with india-rubber by winding, as " above stated, has a further coating of india rubber combined " with sulphur applied thereto by dies or other suitable means,

"and then the coated wire or wires is subjected to the action of "a melted sulphur bath."

[Printed 4d.]

A.D. 1859, April 25.—N° 1039.

HURRY, Henry Columbus.—The title of this invention is "Improved means of and apparatus for obtaining motive power." Electro-magnetism is the means alluded to.

A large number of magnets or electro-magnets is fixed "with "constant poles in a circular frame in such a way that their ends "are exposed on the inner surface of such circular frame, and that "their poles alternate in the line of the circle." A wheel, on whose periphery is placed a large number of electro-magnets, is free to revolve upon an axis concentric with the circular frame. The electro-magnets, mounted on the wheel with their poles near to those of the fixed magnets, are magnetized in sets by means of a wheel commutator, so that "as the electro-magnets in the "wheel approach the fixed magnets, they are of the contrary "polarity and therefore attracted, and when passed and receding "being of the same polarity they are repulsed." A rotary motion is thus given to the shaft of the wheel, which can be transferred to any machinery by means of suitable gearing.

The Drawings show an electro-magnetic engine with four wheels mounted on the same shaft and connected together. Each circular frame contains two hundred electro-magnets, and each wheel contains two hundred and twenty electro-magnets. Twenty electro-magnets on the rotating cylinder are opposite to a similar number of electro-magnets on the fixed frame, and can be magnetized at once if desired; if preferred, however, the twenty may be divided into sub-sets of magnets, say of five, which may be magnetized at the same time.

[Printed, 10d.]

A.D. 1859, April 26.—N° 1044.

MACKENZIE, William.—"An improved method of printing "impressions upon an enlarged or reduced scale, either from "engraved plates, electrotypes, blocks, drawings, or other sur- "faces."

1st. A mode of producing electrotype printing surfaces. A sheet of India-rubber is laid upon the impression to be copied and

forced into its interstices by pressure. The whole is subjected while under pressure to the necessary heat for vulcanizing the India-rubber and fixing the impression upon its surface; the pressure is then released. The impressed vulcanized India-rubber is then extended to the required size by means of a suitable frame and metallized by nitrate of silver. An electrotype impression is finally taken and detached from the mould.

2nd. Producing printing surfaces by transfer to a sheet of vulcanized India-rubber.

A sheet of vulcanized India-rubber is thinly coated with a transfer composition and the design is transferred to its surface from an original plate by means of transfer ink. The enlarged design, produced by stretching the sheet as described above, is transferred to a prepared zinc plate which is subjected to the electro-etching process, sulphate of copper being the solvent used. A design of raised lines is thus produced. If a sunken design is required an electro-cast of the electro-etched plate is taken.

Another method of producing a sunken design consists in taking a transfer, on transfer paper, from the surface of an engraved plate and laying it down on to a lithographic stone or on to a zinc plate. The design on the zinc plate being etched, it is transferred to a sheet of India-rubber and enlarged as described above, and again transferred to another zinc plate, which is either etched or electro-etched. Instead of using two zinc plates in this process, the design may, if preferred, be immediately transferred to the India-rubber surface.

To make an engraved plate from a raised surface, an impression in common ink is transferred to a stone, the surface of which has been washed with gum water. Gold leaf is laid over the whole, and made to adhere to the ink by pressure. When the stone is dusted the impression is left in gold. "Transfer ink is then "washed over the whole surface, and the impression brought up, "as is well understood, white lines or spaces being left in place "of the covered parts. The negative of the block or other raised "surface being now obtained, it is transferred to the elastic "sheet, stretched or diminished, and proceeded with as before "described."

The frame for extending the India-rubber sheet is composed of a rectangular shape of four pieces of wood in which two interior

sliders work across the rectangular frame ; small clamps slide in a slot in each of these sliders and by the combined motion of the sliders and clamps (the edges of the elastic material being fixed in them) the design is extended proportionally. The sliders and clamps may either be moved by screws or by cords.

If a reduced design is required, it is transferred from the original plate to the elastic material already stretched, and, after the sheet has regained its natural size, the process of electrotyping or transferring to a zinc plate is completed.

[Printed, 4d.]

A.D. 1859, April 26.—N° 1045.

NEWTON, William Edward (*a communication from Madame Lefebvre*).—" Improvements in the manufacture of nitric acid, " and its application for the production of artificial nitrous or " nitric salts."

This invention relates to the production of nitric acid or its salts by the electro-decomposition of atmospheric air, and the subsequent absorption of the gas thus produced by water or by an alkaline solution.

In a small apparatus, described in the Specification and shown in the Drawings, the air is contained in a globular vessel, the narrow neck of which is inverted over a vessel containing water or an alkaline solution. " In the centre of the inverted vessel, the " two poles of a battery are made to nearly meet, and by giving " out an electric spark, the air contained in the vessel will be " decomposed, and a continuous stream of atmospheric air being " supplied to the vessel through a suitable opening, this action " may be kept up for any length of time. The water in the lower " vessel may also be decomposed by means of electricity, and " made to give off oxygen, which will combine with the nitrogen " given off from the air, thereby forming nitric acid."

An apparatus for manufacturing on a large scale is also described and shown. It consists of an acid-proof chamber, at the bottom of which is a vessel containing water or an alkaline solution. The sides of the chamber are provided with openings for the admission of the electric wires and of air. Pipes and cocks for the supply and discharge of the liquid are added.

[Printed, 8d.]

A.D. 1859, April 28.—N° 1069.

HOLMES, NATHANIEL JOHN. — "Improvements in electric "telegraphs, and apparatus connected therewith."

This invention consists of a new combination of parts that compose a "radial coil:" Each layer of insulated wire that forms this galvanometer coil is wound in three separate directions; about a third portion of the wire is wound parallel to the extreme deflection of the needle in one direction, another third portion is wound parallel to the extreme deflection in the other direction, and the remaining portion of the layer is wound parallel to the needle when it is in a state of rest. The effect of this arrangement is, that the magnetic power of a portion of the coil is always at right angles to the needle, whether it be at its central position or deflected against its stops, also that "the polarity of "the needles or indicators is always preserved at a uniform "distance from the influence of the coil during the motion "derived from any transmitted or received current."

Two magnetic needles are used in this instrument and are mounted on a cradle fixed to the axis in the centre of the coil; they have their similar poles adjacent, and may be either parallel or divergent.

In an arrangement by which the maximum effect of a given current upon a given magnetized needle is secured, the needle axis is vertical, and one of the needles carries a small mirror at each extremity. By means of two other mirrors, each having its own pencil of light, the movements of the small mirrors, and thence of the needles of the coil are registered upon moving photographic paper. The adjustments are such that, when the needles are in their normal position, a double continuous mark is registered upon the paper, and that when the said needles are deflected, a single mark showing the direction and the angle of deflection is registered, within a certain field on the photographic paper. "A "self adjusting compensation for earth or variable currents" is thus secured "independent of the motion obtained by the trans- "mission or reception of currents, and that without interruption "or interference with the signals obtained by such transmitted or "received currents."

[Printed, 8d.]

A.D. 1859, April 28.—N° 1070.

LARDENOIS, Eugène (*a communication from Bonnet Frederic Brunel*).—"Improvements in the manufacture of pulp for paper, "pasteboard, and other like articles."

"This invention consists in manufacturing pulp from vegetable "substances without rags, by subjecting them, first, to the action "of steam; second, to the blows of heavy hammers, and to "pressure between rollers; third, to solutions of protoxide of "sodium under pressure; fourth, to mineral acids, and to wash-"ings in water; fifth, to chlorine or chlorides, to carbonic acid, "to oxalic acid, to heat, to galvanic currents, and to pressure."

After the vegetable substances have been submitted to the action of the solution of protoxide of sodium under pressure, the liquid is squeezed out from the fibres, they are washed in clean water and then subjected to the action of a mixture of "hydro-"chrolic" [hydrochloric?] and oxalic acids and "electrified," "and for the space of about one hour the voltaic currents are "polarized about every five minutes."

If the pulp is destined for the superior sorts of paper, it is passed through the remainder of the operations as mentioned above, in an apparatus called an "electro-chlorigene." The electro-chlorigene is a cask lined with lead and free to revolve upon hollow axles; inside the vessel platinum blades are fitted which can be connected respectively with the positive and negative poles of a battery. The electric currents are applied when the cask contains a certain amount of chloride of calcium and carbonic acid; the voltaic currents are "polarized" every four or five minutes for about half an hour; the remainder of the operations are then proceeded with.

[Printed, 4*d*.]

A.D. 1859, April 30.—N° 1083.

TOUSSAINT, Joseph.—"A new process of modelling & mould-"ing for galvano-plastic."

A leaf is put on a plate of modelling wax, brushed with spirits of wine, then with water, and a thin mixture of modelling plaster and water is equally spread, by hand, over the wet leaf. The plate of wax is taken away when the plaster is set, a

fatty matter is spread upon the borders of the plaster next the leaf, and the reverse of the leaf is obtained in a similar way to that above described. The plaster moulds are then separated, put to dry in a stove, thrown into a bath of boiling stearine and then into boiling turpentine. When the mould, thus prepared, is metallized, it is ready to be placed in the electro-depositing bath. From this electro-cast of the leaf an electro-mould in hollow may be obtained by coating the said electro-cast with a solution of wax in turpentine and submitting it to the action of the electro-depositing bath.

The plaster moulds are metallized by means of a solution of nitrate of silver in spirits of wine. To prove whether the metallization is complete, the vapour of sulphuretted hydrogen (disengaged from a mixture of muriatic acid, distilled water, and "sulphur of barytes or barium") is directed upon the moulds. If, after this operation, there are any white spots on the moulds, they are coated with a solution of nitrate of silver in volatile alkali.

"Flower moulding is done in the same manner as the leaves," except that no spirits of wine is used before laying on the plaster.

Fruit moulding is done in the same manner as the leaves. The fruits, already smeared over with moistened plaster, are made fast upon small pieces of dry plaster, and covered over with a second coating of plaster, a silken thread having been previously laid on the fruit. While the plaster is yet in the paste, the mould is cut in two by means of the silken thread.

The wood ornaments that accompany vegetables are moulded in gutta percha and metallized the same as the plaster moulds.

When it is required to electrotype a picture frame, clock pedestal, or other similar article ornamented with flowers, leaves, or fruit, they are grouped and fixed upon a wooden or plaster frame, in the form to be moulded, by means of pins and needles, "the whole is then operated upon by the same means as before." In applying leaves to this kind of ornamentation they are backed up and thickened with an elastic paste composed of wax, resin, ochre, starch, and lard.

"Reptiles, insects, and birds are moulded in the same manner "as the vegetables."

"Shells are moulded in gutta percha and gelatine."

[Printed, 4d.]

A.D. 1859, May 2.—N° 1096.

BROOMAN, RICHARD ARCHIBALD (*a communication from Alexandre Paul Marie Darlu*).—" Improvements in and in con-" nection with electro-magnetic engines."

The inventor " employs two fixed electro-magnets, the inner " sides of which are upright and near to each other, while their " outer sides are inclined and approach each other at the upper " ends, being connected by a bronze or other like coupling piece. " Above these magnets he places a knife edge or other suitable " contrivance, and by means of this suspends two movable " electro-magnets, which are rigidly connected at top, and the " inner sides of which are inclined in such manner, that as they " oscillate from side to side their faces alternately come against " and coincide with the faces of the fixed magnets. The lower " ends of the movable magnets are connected by a cross piece or " cross pieces on their sides, to give rigidity to their connection. " The lower ends of these oscillating magnets are each connected " by a connecting rod with a short arm, which is attached to a " shaft carrying a long arm. The end of this long arm is con-" nected by a rod to a crank on the main or other shaft of the " engine whereby the engine is driven. The coils of the magnets " are formed of covered wires wound upon cores, and placed within " the magnets." The currents are changed by means of a wheel commutator over which the roller of a radial bar runs, the metallic contact pieces being arranged in concentric circles on the face of a wheel on the driving shaft.

The Drawings show a locomotive fitted with this electro-magnetic engine.

When the engine is large, the electro-magnets have their poles formed with taper projections and apertures which fit into one another, to prevent " the active poles from becoming distant the " one from the other."

[Printed, 8*d*.]

A.D. 1859, May 7.—N° 1152.

FROST, CHARLES.—(*Provisional Protection only.*) " Improve-" ments in the construction of electric telegraph cables."

" The telegraphic conductor or conductors are first coated with " gutta percha or other insulating material as heretofore, and then

"surrounded with rings of metal, which are slipped over the "conductor or conductors while open, and then closed thereon by "suitable nipping instruments.

"Between the metal rings are introduced rings of cork or other "elastic material, so that the metal rings nowhere come imme-"diately in contact the one with the other. To complete the cable, "a covering of hemp or other fibrous material is put on over the "rings either spirally or otherwise.

"By the use of metal rings, as before described, the conductor "or conductors are effectually protected from damage, and at the "same time a very flexible cable is obtained. The rings also "prevent the covering of hemp or other material from pressing "on the conductor or conductors which are thus left entirely free "from the exterior covering."

[Printed, 4*d*.]

A.D. 1859, May 11.—N° 1183.

HENRY, Michael (*a communication from Samuel C. Bishop*).—"A mode of protecting the mariners' compass against local "attraction."

"This invention consists in lining the compass box or binnacle "with gutta percha or other insulating substance so applied as "to completely enclose the compass, and so insulate it from the "attraction of any surrounding bodies."

[Printed, 6*d*.]

A.D. 1859, May 12.—N° 1194.

WARNE, William, FANSHAWE, John Americus, JAQUES, James Archibald, and GALPIN, Thomas.—"An improved "compound or preparation of materials for, and mode of, and "apparatus for covering and insulating wires or conductors used "for telegraphic or electrical purposes."

1st. A compound "for covering or insulating telegraphic wire." "When no gutta percha is employed in the compound, its ingre-"dients consist of caoutchouc, coal tar pitch, and French chalk "(silicate of magnesia);" when gutta percha forms one of its ingredients, they are caoutchouc, gutta percha, coal tar pitch, plumbago, oxide of lead, and silicate of magnesia. These materials are brought into a plastic state by heat, and then ground and well mixed together. The electric telegraph wire is coated with this

material by expressing it from "suitable dies through which the "wire conductor issues."

2nd. A mode of applying insulating compounds to electric conductors. In the apparatus described in the Specification and shown in the Drawings, a steam-heated cylinder communicates with a chamber, also heated by steam, in which a metal plate or die revolves. The cylinder and chamber are filled with insulating composition, and a tube passes through the centre of the chamber and of the plate or die. When the piston of the cylinder, by its motion, expresses the composition through an eccentric aperture in the revolving die, and the wire is passed gradually through the tube, the action of the machine is to lap a strip of the compound helically round the wire. While in a plastic state, the lappings are consolidated by passing the covered wire through grooved rollers. The covered wire may then be enclosed in a covering of fibrous material and waterproof substance, on which is to be dusted and fixed "a coating of pulverized glass or flints."

[Printed, 1s.]

A.D. 1859, May 14.—N° 1213.

CHATTERTON, JOHN.—"Improvements in covering wires and "other metal conductors for telegraphic purposes."

The principal object of this invention "is to interpose a more "elastic substance between the insulating material and the ex-"ternal wires or other strengthening materials, by which any "blow or pressure or action on the external surface of a cable or "rope will be prevented passing to the insulating coating of "gutta percha or compounds thereof."

An elastic ribbon, either of India-rubber or of vulcanized India-rubber, is wound helically round the insulated wire, so that each succeeding layer shall, to a certain extent, overlap the preceding one; the external wires or yarns are applied over this elastic coating, in order to produce a cable or rope. Before the elastic material is put on, the insulated wire may be passed through adhesive material composed of gutta percha, wood tar, and rosin, as set forth in N° 1811 (A.D. 1858), or wood tar alone may be used. If more conducting wires than one are used in a cable, each wire is subjected to the same protecting process.

If the elastic coating be of India-rubber, the coated wire may be passed through a solvent of India-rubber, so as to unite the edges

of the said coating. A coating of gutta percha or its compounds may be put over the elastic coating by the ordinary machine. In place of or in conjunction with the above-described helical band, a fillet of vulcanized or other India-rubber may be applied and cemented longitudinally round the insulated wires. Instead of using vulcanized or other India-rubber, a compound of India-rubber and gutta percha may be applied over the insulating coating by an ordinary covering machine.

[Printed, 4d.]

A.D. 1859, May 24.—N° 1285.

GREENOUGH, Benjamin Franklin.—(*Provisional Protection only.*) The title of this invention is "An electrical conductor "for submarine telegraphs, which I denominate a hydro-electric "conductor."

The inventor states:—"I employ a tube of gutta percha, vul-"canized india-rubber, or other waterproof material, which shall "contain and be impervious to water, and of sufficient length for "the purposes intended, and I fill the same with pure water. "This tube I submerge the distance the cable is to be laid, either "before or after it is filled, making its ends communicate with "proper cups for receiving the electric current from any sufficient "electric telegraph apparatus; I thus make a conductor of water "to be used instead of metal, and pass the current through it in "the same way or in an analogous manner to that employed in "metal conductors. To protect the tube, I employ one or more "wires of iron or other metal to sustain its weight by binding the "wire and tube together, or if found necessary a series of straight "metal wires may entirely surround the tube."

[Printed, 4d.]

A.D. 1859, May 25.—N° 1289.

GLASS, Richard Atwood.—"Improvements in submarine "electric telegraph cables."

1st. "Protecting the insulated conducting wires of submarine "electric telegraph cables, whatever may be the material with "which the same are insulated, by surrounding the insulating "material with wires of iron, steel, or other suitable metal, which "wires are individually and separately 'served' or covered with "hemp or other like substance, and then laid individually around

" or upon the insulating material." This portion of the invention is not claimed in the Complete Specification, as the inventor has discovered that it is not new.

2nd. " Insulating the conducting wires of submarine electric " telegraph cables by coating or covering them first with a layer " or layers of gutta percha, and then with a layer or layers of one " or more of the compositions or compounds " set forth in N° 2270 (A.D. 1858).

[Printed, 4d.]

A.D. 1859, May 30.—N° 1325.

SMITH, ARCHIBALD.—" Improvements in machinery for making " lines, ropes, and cables for telegraphic and other purposes."

The Provisional Specification states that this invention consists " in additions to and improved arrangements of the rope ma- " chinery " described in N^os 14,021 (Old Law) and 442 (A.D. 1857).

1st. The use of a tube for the protection of the core of a telegraphic cable during the process of manufacture. The said core passes from a reel at the back of the machine, through the tube, to the laying plate at the front of the machine. The two ends of the tube are centrical to the machine, but the centre portion is fixed to the external part of the cage frame of wire reels, and revolves with it; owing to one end of the tube being fixed to a bracket, however, the tube itself does not revolve on its axis; the connection between the centrical and eccentric portions of the tube may be made by means of universal joints and short angular tubes or by a chain passing round chain wheels, the central chain wheel being kept from revolving by a pendulous weight, or by toothed wheels and a pendulous weight.

2nd. " Improvements in former Patents;" N^os 14,021 (Old Law) and 442 (A.D. 1857), are mentioned as the former Patents in the Provisional Specification. The cylinders of the machine are carried round a common centre by the application of motive power, and the reels of each cylinder " are supported or carried in " arms revolving in brackets or sockets fixed to the discs of the " cylinder, and are prevented from turning round on their axis " [axes?] " by universal joints and pinions."

In a machine for laying wires into strands and the strands into a rope simultaneously, the same means are taken to prevent the

reels turning on their axes as in the above-described machine. The whole of the cylinders revolve on the axis of the machine, thereby twisting the strands together at the central laying plate, and forming a rope; the cylinders also revolve on their own axes to produce a strand by the wires meeting at a laying plate fixed at the axis of revolution of each cylinder; the reels are so geared with the cylinders as to prevent the twisting of the wire.

When it is desirable to avoid the bending of the core of the electric cable by the use of the jointed tube described in the 1st part of this invention, the bobbins are mounted concentrically with the wire or rope to be covered. "The covering material is led "from the bobbins over hooks or pullies fixed to the stretching "bars of the skeleton frame to the front end of the machine, "where they are wound around the core by the revolution of the "lantern frame or cylinder, the draw off being by any ordinary or "suitable means."

[Printed, 1s. 4d.]

A.D. 1859, June 23.—N° 1509.

VARLEY, Cromwell Fleetwood, and VARLEY, Cornelius John.—"Improvements in proving electric conductors, & in "the apparatus connected therewith."

The chief object of this invention "is to find out the locality "of defects in the insulation of a conductor, or imperfect con-"tinuity of the latter, without removing the covering or the "insulator, or cutting the conductor for testing."

1st improvement.—To ascertain the approximate locality of a defect in the insulation of "a cable in the maker's stores, and "under water." A galvanic battery, differential galvanometer, and rheostat are used for this purpose. One battery pole is connected to the water in which the cable is immersed, the other battery pole is connected to two of the terminals of the galvanometer, so that the electric current passes through the two galvanometer wires in opposite directions; the two remaining terminals of the galvanometer are connected with the two ends of the cable. "The current from the battery divides and goes "round the galvanometer in opposite directions, and, entering "both ends of the cable, escapes at the defect in the insulator." If the defect is equi-distant from the two ends, "the resistance "will be equal, the currents round the galvanometer will be equal,

"and the needle will stand at zero." If the fault be not in the middle of the cable, the needle will be deflected. A rheostat is now introduced into the shorter circuit, and its resistance is thereby made equal to the resistance of the longer circuit. The formulæ employed to indicate the locality of the defect, by means of the data obtained from the above-mentioned arrangements, are as follows:—If the resistance of the whole conductor = S, of the longer portion $= x$, of the shorter portion $= y$, and of the rheostat $= r$; then $x + y = S$, $x = y + r$, and $\frac{S - r}{2} = y$. It is preferred to connect the galvanometer, and thence the conductor, with the negative pole of the battery, "as a "negative current, both attracts moisture to the fault, and keeps "the metallic surface in an unoxidised state."

2nd improvement.—Testing for the actual locality of a defect by means of "probes." The "probes" consist of "coils of wire, "iron bars, or horse-shoes wrapped with wire;" they are applied outside the defective conductor and are acted upon by the magnetic power excited around the conductor every time the electric current traversing the said conductor flows, ceases to flow or is reversed. The electric currents induced in the coils of the "probes" are rendered manifest by means of a reflecting galvanometer. The locality of the leak is ascertained by causing alternating or intermittent electric currents to enter the conductor at both ends, the said currents being of different rates of alternation or intermission at each end,; each set of currents is allowed to escape at the leak. On applying the "probe" outside of the conductor, the speed of the deflection of the galvanometer needle indicates on which side of the fault the probe is, and ultimately enables the precise locality of the fault to be ascertained by moving the "probe" along the conductor. Another method of testing consists in applying the intermittent or alternating currents to one end only of the cable.

When the defect is a break in the conductor, or a very small defect in the insulation, a powerful current from an induction coil is passed through the conductor, and causes defective insulation at the break, in consequence of the heat developed there; or the small defect in insulation is enlarged from the same cause. The "probes" are then applied and the locality of the defect is ascertained in the manner described above.

To reverse the electric currents through the defective conductor

it is preferred to employ the reversing key described in N° 371 (A.D. 1854).

3rd improvement.—Testing for faults in an electric conductor by means of electric induction.

"When the conductor under examination is simply a wire "coated with an insulator and the conductor is broken but "insulation sound," currents of considerable tension are applied to one end of the wire, and a tube or other insulated conductor is placed round or near the defective conductor, so that the charge entering the wire acts by electric induction on the said tube, thereby enabling the tube to act the part of the outer coating of a Leyden jar. An exhausted receiver contains two conductors, one of which is connected to the above-mentioned tube, the other to the earth. The place of the fault is ascertained from the luminous or non-luminous appearance of the conductors in the receiver.

"When it is desirable not to damp the insulated wire con- "taining a defect in its insulation," the whole coil is put into a large exhausted receiver, and, on causing currents to enter at one end of the wire, their escape into the rarified air, from the defects, causes a luminosity at the places of the defects.

An exhaust pump suited to make the above-mentioned exhaustions is described and shown; it has a perfectly free passage from the receiver to the barrel when its double piston is rising, "and the same passage is perfectly closed when the piston de- "scends without any valve, mercury being used to effect that "purpose."

To measure the distance of a break in the conductor, from a given place in the said conductor, without burning open the insulator, by induction—a non-magnetic rheostat, induction plates and differential galvanometer are employed. The comparative electric value of the induction plates is known, and they are "added to the coils of the rheostat, so as to give them induction "corresponding in amount to that of an equal length of cable;" from the amount of induction surface necessary to neutralize the induction of the cable, as found from the galvanometer, the distance of the break is calculated. To reduce the surface of the induction plates the galvanometer is wound with many wires, the cable is connected to one wire and the rheostat to the remainder in one continuous circuit.

4th improvement.—Testing for defects at sea.

A sea table is used to support the galvanometer or indicator

upon. This table is supported upon a point at its centre of gravity and is retained in the horizontal position by means of short quickly oscillating pendula whose centres of suspension are equi-distant from the centre of gravity of the table.

Many details connected with operations at sea are set forth at length in the Complete Specification, but their principal points have already been alluded to.

5th improvement.—In order to ascertain the localities of defects in an underrun cable, or to pick out of a number of telegraph lines the one under test, an astatic needle, in a case, is applied to the outside of the conductor; the deflection of the needle indicates the passage of the electric current. This apparatus is very applicable when the conductor has no iron covering nor any iron near to it, and may be of much service in tunnels or street work.

6th improvement.—Testing a telegraph wire suspended in the air. A voltaic battery is connected to the wire at each end of the line, so that similar currents enter the line and escape at the leak or earth contact. On the application of a galvanometer to a circuit derived from the telegraphic line, the position of the leak may be ascertained. The galvanometer should be astatic and sensitive, and wound with thick copper wire. "The strength of "the current traversing the galvanometer is shown by the for- "mula, $i' = \frac{R}{R+r} i$," in which i is the current traversing the telegraphic line before the attachment of the derived circuit, R is the resistance of the portion of the telegraphic line included between the terminals of the derived circuit, r is the resistance of the derived circuit, and i' is the current traversing the derived circuit.

[Printed, 10*d*.]

A.D. 1859, July 11.—N° 1647.

NEWTON, William Edward (*a communication from George W. Beardslee*).—"Improvements in magneto-electric machines."

1st. Constructing compound magnets. The poles of these magnets are at the extremity of arms which radiate from a centre. The inner ends of the arms may be closed "either by contact, or "by a continuous ring in the same plane."

2nd. Constructing helices for magneto-electric machines. The spool heads have elongations towards one side, with holes through

them; the helices are secured to the holding down plate or bed plate by means of bolts that pass through the said holes.

3rd. Combining with the rotating compound magnets, that form the first part of this invention, one or more pairs of fixed insulated rings "for receiving the induced elastic" [electric?] "impulses." These rings are placed outside the circle of rotating magnets and the terminal wires of the fixed coils are connected to them.

4th. "A pole changer" that changes the alternating current of the magneto-electric machine into a direct current. An arm, that is vibrated by means of electro-magnets, makes the requisite contacts between fixed contact screws, and has insulated contact pieces and wires that dip into mercury cups for that purpose. The electro-magnets are excited by the currents from the magneto-electric machine and act upon a pendulous permanent magnet on the axis of the vibrating arm.

A magneto-electric machine, described in the Complete Specification and shown in the Drawings, has the improvements above set forth. The coils are fixed on circular bed-plates, and the permanent magnets are fixed to a vertical shaft that rotates in the centre of the circles of coils. Several compound magnets may be mounted on the same shaft and act upon several circles of coils, each compound magnet being placed between two sets of coils. The compound magnets have their alternate radii of the same polarity, and if several are fixed to the same vertical shaft, the poles in the same vertical line (of different compound magnets) are also alternated.

The 1st and 4th improvements "may be used independently of "the others."

[Printed, 1s.]

A.D. 1859, July 18.—N° 1696.

NEWTON, William Edward (*a communication from Thomas C. Avery*).—"Improvements in the method of constructing and "operating batteries for generating or exciting by chemical action "electricity for telegraphic purposes."

These improvements are based upon Grove's battery but are applicable to others.

1st. Insulating the outside and certain other parts of the zinc element "by means of an amalgam of mercury and lead or tin "mixed with rosin and hard tallow."

2nd. The use of two or more pieces of platinum, instead of one entire piece as commonly used in Grove's battery.

3rd. "The insulation of the top and bottom of the porous cups "by means of wax or other suitable substance."

4th. "The use of an insulating amalgam to amalgamate the "zinc of galvanic batteries for telegraphic purposes."

A Grove's battery with the above-described improvements is described in the Complete Specification and shown in the Drawings. This battery consists of an earthenware vessel containing the cylinder of zinc, porous cell, and platinum plates; the porous cell has a funnel-shaped mouth and the platinum plates are joined at the top, so as to form an inverted V.

[Printed, 6d.]

A.D. 1859, July 28.—N° 1749.

SMITH, Charles Wesley.—(*Provisional Protection only.*) "Improvements in electric telegraphs, and in the apparatus con-"nected therewith."

1st. "An improved system or mode of preparing despatches for "transmission through telegraphic wires." Metal pins, fixed to a strip of wood, make electric contact with suitably arranged springs; the pins can be placed so as to make contact or not, and, when only one row of pins is used, the position of any pin may be changed so as to "transmit either a positive or a negative "current."

2nd. Recording the positive and negative currents "upon che-"mically prepared paper, without the intervention of a local "circuit." Two styles are used for this purpose, either—by means of permanent and electro-magnets—dividing the currents, the positive to one style, the negative to the other, or—by arranging the electrical connections—sending the currents upon both styles, so that one style shall record positive currents only, the other negative currents only.

3rd. Constructing and paying out submarine cables. The conducting wire or wires is or are surrounded with a lapping of thread and varnish, then with a coating of gutta percha and lapping of rope; a second layer of gutta percha is applied, and the whole is enclosed by an external covering of small iron wires. The cable is coiled on board in a twist the reverse of that to which it is liable during the process of paying out.

4th. "A peculiar code of electric telegraphic signals." "All "the words in common use in business are represented by single "letters and by arbitrary combinations of two or more of the "letters of the alphabet."

[Printed, 4d.]

A.D. 1859, July 30.—N° 1767.

GURNEY, GOLDSWORTHY.—(*Provisional Protection only.*) The title of this invention is "Improvements in electric telegraphic "conductors."

The inventor states:—"My plan for constructing a submarine "conductor for an electric telegraph is to use a flat ligature or "ribbon of copper or other suitable conducting metal, instead of "a straight cylinder wire or spiral cord, as commonly used. I "coat this ribbon with a vitreous covering or varnish; I place "on this, india-rubber or gutta percha, or other insulating "medium. To support and to prevent this ligature from "breaking, I fix flat ribbons of steel on either side for deep sea "telegraphs, where great strength is required, on which steel "ribbons the strain is made to fall. Iron or other metal may "be used for ordinary depths, where less strength is required. "The whole may be bound together with thin wire or string, or "other suitable binding or covering, and several conductors may "be combined in one band when required."

[Printed, 4d.]

A.D. 1859, August 1.—N° 1778.

MERRELL, ELIZABETH.—"Improvements in apparatus for "washing and cleansing."

According to this invention, washing or cleansing apparatus is provided "with means for obtaining electric or galvanic agency, "in order that the same may act upon the suds or purifying "agents employed, and thereby assist the operation thereof, and "produce useful and advantageous effects."

In one instance, the washing or cleansing apparatus is furnished with the elements of a galvanic battery, which are placed in the soap suds, and the articles to be cleansed are rubbed against the outer zinc case. This apparatus for applying the galvanic current, as above stated, consists of a hollow and perforated zinc box, made of corrugated zinc, which encloses a

copper plate; these metallic elements, together with the soap suds, form the galvanic combination. "The articles to be washed "are rubbed upon the fluted plates."

"A smaller apparatus may be constructed for placing in "coppers and like receptacles among articles while being 'boiled' "for cleansing purposes therein." This apparatus consists of a flat cylindrical zinc case with perforations; it "has flat zinc sides "or plates instead of fluted ones."

[Printed, 4d.]

A.D. 1859, August 5.—N° 1806.

MENNONS, Marc Antoine François (*a communication from Irénée Leys*).—"A system of columns or monuments to be "employed as sentry boxes, branch post and other offices, *tele-* "*graph* and fire-engine stations."

"The invention consists in the construction and arrangement "of a system of columns or small monuments intended to meet "different requirements of public thoroughfares. Up to the "present time, the various structures of this nature which are to "be found in the main streets of large towns have each been "confined to one special application, postal columns, sentry "boxes, urinals, &c. etc. The main object of the present system "is to render uniform in outward appearance, and to centralise, "as far as practicable, these different structures by multiplying "the applications of each, thus economizing to a considerable "extent the street space at present needlessly occupied."

The column shown in the Drawings is about eighteen or twenty feet high, and is surmounted by a weather cock and lamp. It also has an illuminated clock, sentry box, letter boxes, and urinal. Other arrangements are shown, but the arrangements of a telegraph station are not described in detail.

[Printed, 8d.]

A.D. 1859, August 5.—N° 1811.

THOMPSON, Warren.—"An improved printing telegraph."

The despatches are transmitted in the ordinary letters of the alphabet by the alphabetic finger keys of the "manipulator" to the "receptor," which prints the despatches in the same characters.

The finger keys of the "manipulator" are arranged concentric

with a central axis, with which they are connected by means of levers, there being one lever to each key. On the depression of a finger key, one stop pin is pushed into a pin wheel, and another is protruded therefrom; clockwork mechanism is thus allowed to revolve the central shaft, until the protruded pin comes into contact with a fixed stop; the speed of the clockwork and the completions of the electric circuit are regulated by means of an "anchor" and pallet wheel. By this means "a certain number " of regular pulsations or alternate transmissions and intercep- " tions of the electric current are affected and imparted to the " receptor."

The armature of the "receptor," by its vibrations, enables the type-wheel axis to revolve in unison with the central axis of the " manipulator," a clock train and escapement being fitted to the "receptor" for that purpose. The feed of the band paper is accomplished by means of a separate clock train, which is released at the proper time by means of a ratchet wheel on the type-wheel axis. A cam wheel, connected with the clock train that feeds the paper, impels forward the printing pad when the type wheel and paper are suitably placed. The type wheel is attached to its spindle by means of a small barrel spring; when the letter is printed, a clutch is raised from the type wheel, and the barrel spring returns it to zero. The clutch is then replaced ready to carry round the type wheel for the next letter.

[Printed, 10*d*.]

A.D. 1859, August 6.—N° 1812.

DRAKE, William Richard (*a communication from Emile Schneider*).—"An apparatus for conducting electricity in the sea, " and for telegraphing and sounding in deep water."

This invention consists "in the construction of cables and lines " suitable for telegraphing and sounding in deep water with the " conducting wires laid spirally around a cord, and protected from " injury by an envelope or covering shorter than the conducting " wires."

In constructing the telegraph cable, six or seven conducting wires are wound helically round a central linen thread. The coatings that are successively placed round this core are, "black " oakum," gutta percha, and "black oakum" again. The external covering consists of iron wire or cord laid over the encased

conductor in helices of long pitch, or some of the wires may be laid longitudinally and kept in their places by the helical disposition of the other wires. In one instance the Drawings show the external wires laid in right-handed and left-handed helices upon the covered conductor.

In the line for deep-sea soundings, two linen yarns are respectively wound helically with three copper wires, and each covered yarn is separately insulated with cotton; a coating of hemp plait encases the insulated wires, and the whole is coated with gutta percha. One end of the compound wire or line "is fastened to " Brooks' deep sea sounding apparatus, and the other end is " wound on a roller or wheel in combination with an electro- " magnet and a galvanic battery. By this means the contact of " the lead with the bottom of the sea can be ascertained the in- " stant such contact takes place."

[Printed, 8*d.*]

A.D. 1859, August 9.—N° 1837.

ROLLAND, Pierre François.—"A new electric telegraph."

The instruments comprised in this invention are, "a manipu- " lator," "receiver," relay, and "automatical controller." By the stoppage of the rotating handle of the "manipulator" over any particular latter on the alphabetical dial plate, that letter is printed on a strip of paper by the type wheel of the "receiver."

The "manipulator" handle is capable of being depressed at its external extremity as well as of being rotated round the dial plate. The pressure of the handle downwards raises a spindle that passes through the hollow central axle, and, by means of a commutator, changes the direction of the electric current. During the revolution of the handle round its axis, intermittent currents enter the telegraphic circuit, but the depression of the handle prevents the further revolution of the type wheel of the receiving instrument, and, by calling the relay circuit into action, prints the letter.

The "receiver" has a type wheel that is rotated by means of the intermittent currents from the "manipulator." These intermittent currents vibrate an escapement pallet that carries at its furthest extremity a permanent magnet; the clockwork connected with the type wheel can then rotate the type wheel in unison with the rotation of the "manipulator" handle; but when the reverse current traverses the line-wire electro-magnet the above-mentioned perma-

nent magnet remains in its place, and the local circuit, called into action by the relay, has time to actuate the printing lever and to move the paper forward for the printing of the next letter.

The "automatical controller" is called into action at each revolution of the type wheel by means of electric contacts made by a projection from the type-wheel axis. The "automatical controller" consists of an electro-magnet worked by the relay battery; when this circuit is complete, the armature of the electro-magnet makes such electric contacts as to send a current from the local battery of the "automatical controller" into the telegraphic circuit (independent of the receiver) which rings an electro-magnetic bell close to the "manipulator" and thus apprizes the operator of the arrival of the type wheel at a given position. If it is wished to ring the said bell at the printing of each letter, the requisite electric contacts are made by the printing lever.

[Printed, 10*d.*]

A.D. 1859, August 12.—Nº 1866.

LABIN, Hirsch.—(*Provisional Protection refused.*) "Improved "machinery applicable to musical and telegraphic instruments."

The machinery applicable to musical instruments consists of certain organ barrels with removeable pins, arrangements of pianoforte mechanism by means of which piano, forte, and medium tones can be executed with great facility, and apparatus for writing music as it is played.

The electric telegraph transmitting apparatus, consists of a cylinder or barrel upon which pins are disposed equal in number to the letters of the alphabet. "The cylinder is supported by an "axis which runs through it and rests in bearings fixed in a "frame. The cylinder is put in motion by a toothed wheel, which "gears into one of certain other wheels, according to the degree "of velocity desired. The points or pins as the cylinder rotates, "act on a lever which has a reciprocating movement on a cross "bar; this carries another lever which transmits the electric "current from the coils, say to the apparatus. At each turn of "the cylinder a certain projection encounters an arm or lever, "which communicates to it a partial rotary movement sufficient "to cause a cord attached to the lever on which the points or "pins strike to advance one projection or one letter. The cylinder "points or pins being previously 'composed,' that is to say, the

" proper pins for forming a despatch being raised every time the " lever is struck by them a current passes into the apparatus and " a signal is transmitted."

[Printed, 4d.]

A.D. 1859, August 17.—N° 1896.

BEARDMORE, Septimus.—(*Provisional Protection only.*) " Im- " provements in electric batteries."

This invention refers to earth batteries, and consists in the method which is adopted "for bringing the positive and negative " metals into electrolytic connection with the moisture of the " earth," whilst at the same time the metals are preserved "from " undue oxidation."

A hole is dug in the earth to such a depth as to ensure a uniform condition of moisture, it is then filled up "with sand or " fine earth mixed with one of the deliquescent salts, which shall " have the property of absorbing the moisture of the atmosphere;" a porous cell is placed in the ground thus prepared. Another hole is dug and prepared in a similar way to that above mentioned. Into one of these holes a positive plate is placed, into the other a negative plate, each plate being excited "in the usual manner." These positive and negative metals are connected "with an insu- " lated wire."

" There is no limit to the distance at which these cells may be " placed apart, so long as the prepared earth in the hole which " has been made, shall be in electrolytic connection with the " uniform moisture of the earth," and so long as the surfaces of the positive and negative metals "are of sufficient size to generate " the necessary 'quantity' electricity" for the particular purpose to which the current is to be applied.

[Printed, 4d.]

A.D. 1859, August 19.—N° 1905.

HENLEY, William Thomas.—" Improvements in machinery " for the manufacture of ropes and cables, and for paying-out and " picking-up submarine telegraph cables."

1st. Compressing a cable during its manufacture to give it " an even uniform appearance." A frame with four compressing rollers is " fixed to the framework of the cable machine a little " in advance of the lay plate." The grooved peripheries of the

rollers all meet at the cable, and the rollers are pressed towards the centre by helical springs adjustable by screws.

2nd. Applying a system of grooved rollers, similar to that described in the 1st part of this invention, to the paying out of cables. This arrangement is used instead of a paying-out drum, and several frames are used, one behind another. The helical springs are compressed uniformly by means of bevil and spur gear attached to the compressing screws, and worked by one handle. Motion may be given to the compressing rollers, "so as to wind " the cable a little faster than the rate at which the ship moves;" this is accomplished by bevil wheels attached to the axles of the rollers, and put into motion by any convenient motive power.

3rd. "An apparatus for catching the cable in case of breaking " whilst paying-out or picking up." The cable passes through a frame, carrying cams and coiled permanent magnets, that is suspended from the ship by ropes; the cams are kept away from the rope ordinarily by the attraction of the magnets for their keepers, but, when the cable breaks, the attendant reverses the electric current circulating round the magnets, and sets free the gripping cams. This apparatus may be made self-acting by passing the electric current through the cable, and thereby actuating a relay and local battery when the breakage takes place. A trigger and line may be used instead of the battery and magnet.

[Printed, 1s. 2d.]

A.D. 1859, August 29.—N° 1964.

EDWARDS, John.—(*Provisional Protection only.*) The title of this invention is "Improvements in the manufacture of " buttons."

The inventor states:—" My invention relates to the manufac- " ture of sewn-through buttons made of either non-metallic " substances or metallic substances. In buttons made of non- " metallic substances I form a hole in the centre, and then insert " a metal bar to form the holes. In buttons made of metallic " substances, I form a hole in the centre of the back shell, insert " an eyelit to cover over the cutting edges, and then insert a " metal bar to form the holes, and bring the front shell down to " the bar to keep it in; but when I make metallic buttons of " high raised sections, I prefer to fix the metal bar which forms " the holes to the inside of the back shell instead of takeing the

" **front shell down to the bar as in buttons of a flat section. I**
" **make these metallic buttons with or without a projecting tubular**
" **shank, *and I claim also the coating of metallic sewn-through***
" ***buttons with a superiour metal by means of electro-plating.*"**

[Printed, 4d.]

A.D. 1859, September 12.—N° 2079.

GISBORNE, Frederic Newton, and MAGNUS, Lazarus Simon.—(*Provisional Protection only.*) " Improvements in tele-" graph cables."

This invention " consists in the holding together of longitudinal " hempen, silk, fibrous, metallic, or other cords, wires, or strands " ranged round an insulated conductor or conductors by paying " round the cable so surrounded with wire, first, with one layer " passing round the cable in one direction, and then with a second " layer in a contrary direction.

" The invention also consists in covering the said longitudinal " surroundings and bindings with a preservative compound of " india-rubber, shellac, resin, and vegetable wax, with pitch, so as " to give the cable a smooth and regular exterior surface."

In some cases the inventor covers " a telegraphic cable, con-" structed as above described, or otherwise, with a coating or net-" work of wire, hair, or fibrous material, the wires or yarns, or " cords of hair, or fibrous material being interlaced or linked " together to form the coating or network, by causing each wire, " yarn, or cord to twist or link with the wire, yarn, or cord on " each side of it alternately as it passes along the cable.

" Or a similar coating or network may be produced by causing " the wires, yarns, or cords employed to pass round the cable " spirally; one set of wires, cords, or yarns passing from right to " left, and another set from left to right, the wires, cords, or " yarns of the two sets twisting together where they cross each " other."

[Printed, 4d.]

A.D. 1859, September 14.—N° 2095.

BESLAY, Charles.—" Improvements in preparing and obtain-" ing printing surfaces with designs sunk, as also in relief."

A varnished glass plate has the design produced upon it by removing certain portions of the varnish; an increased thickness

of varnish is then applied "where large blanks or whites are to "appear in print." The glass plate, thus prepared, is metallized and electrotyped; the electro-cast is electro-tinned, then removed from the glass plate by exposure to slight heat, and backed up with type metal or zinc.

A sunken design is produced by drawing it in varnish on the glass plate; the whole design is then covered with another kind of varnish, metallized and electrotyped.

The second layer of varnish softens at a lower degree of heat than the first layer, the consequence is that the electrotype can be detached from the glass plate without injury to the design; a number of electrotypes can thus be taken from the same design.

The design may be corrected by means of a photographic proof. A photograph, fixed on the back of the glass plate, may be reproduced by means of this invention.

Other details of the manipulation necessary to carry out this invention, and of its application to various purposes, are set forth in the Complete Specification.

[Printed, 4d.]

A.D. 1859, September 17.—N° 2119.

LUIS, Jozé (*a communication from Jules Rousseau*).—"An im-"proved disc & lantern signal with double repeaters."

This invention relates to a railway signal post, worked from a distance by means of an endless chain and pulleys. Another disc signal post, or "mechanical repeater," is placed near to the signal man, and is worked by the same chain that works the first-mentioned signal; this informs the signal man of the proper action of the principal signal.

An "electrical repeater" is used as an additional check upon the successful operations of the principal signal. An electric circuit is established from the signal post to the signal man, or to the station. When the disc is parallel to the road the current is interrupted, but when the disc is placed perpendicular to the road, so as to indicate danger, the circuit is complete provided the other parts of the signal post are in order; if, however, the red glass breaks, the circuit is interrupted by the breakage of the conducting wire across its surface; if the lamp goes out, the mercury of a thermometer in the circuit is no longer sufficiently expanded in its tube to connect the separated ends of the conducting wire. By

these means, combined with an electro-magnetic bell arrangement, accessible by the signal man, the successful working of the various essential parts of the signal post is ensured. A needle indicating instrument may be used as well as a bell.

[Printed, 10*d*.]

A.D. 1859, September 19.—N° 2125.

GISBORNE, Frederick Newton. — (*Provisional Protection only.*) "Paying-out submarine telegraph cables."

"The cable to be coiled round a vertical cylinder or other body " or frame, by preference, with sides parallel with the central " axis, in which revolves a spindle having a slotted arm, which " carries a guide, through which the cable passes. The action of " the guide in the slot is determined either by the movement of " the cable itself when being coiled or uncoiled, or by a simple " mechanical arrangement for gradually decreasing or increasing " the circle described by said guide. The cable having been " drawn from the vessel's hold over a pulley or drum is made to " pass between a double series of grooved wheels or rollers. The " lower series is put in motion by steam or hand power, applied " by preference to friction rollers. The upper series is set in " moveable yokes, and act upon the cable immediately above the " adjacent spaces between the faces of the lower wheels. Pressure " can be applied at pleasure upon the yokes either by weights or " springs. By this arrangement the cable will be assisted over- " board as in delivering a log line by hand, and will be liberated " from strain during any sudden rise of the vessel in a sea way in " proportion to the quickness of such rise."

[Printed, 4*d*.]

A.D. 1859, September 19.—N° 2134.

CLARK, William (*a communication from Mr. Levrett Bradley*). —"Certain improvements in electro-magnetic telegraphs."

This invention comprises a transmitting instrument, in which the requisite electric contacts are made by means of type arranged in composing sticks, and a recording instrument in which the messages are recorded on a paper-carrying cylinder by means of lines made thereon.

In the transmitting instrument the composing sticks are carried forward and pass between the contact mechanism, by means of an endless band that passes over two rollers, one of which is rotated

by a winch. The composing sticks, after they have transmitted the message, are deposited on an inclined plane at the end of the band "one above the other in precisely the same order as that "in which they were placed on the band." The principal features of this instrument, besides the above mentioned, are as follows:— 1st. A double closing of the circuit is effected by the type mechanism. 2nd. The contact mechanism is carried by a "vibrating "insulating plate" that is capable of yielding to the impress of the type. 3rd. A vibrating click and bar are used to make the contacts. 4th. The type are made (by means of a spring) to close a distinct circuit from that closed by the click and bar. 5th. The composing sticks, when filled with type, "present an even and "flat surface on either side."

In the recording instrument, the paper-carrying cylinder is rotated by the same winch that rotates the endless band of the transmitting instrument. The electro-magnet that moves the pen is worked by means of a relay. The other important features of this instrument are:—1st. The marking, inking, or recording apparatus is mounted on a moveable platform which is traversed in such a manner as to record the message in parallel lines on the paper; the recording apparatus includes the receiving electro-magnet, an inkstand, pen, and other appendages. If a message is recorded by means of a continuous zigzag line, the electro-magnet is horizontal, and its armature acts, by means of an arm, upon the pen so as to vibrate it in the same plane as the surface of the paper being written upon; if the record is in dots and lines, the electro-magnet is vertical and the armature carrying the pen is vibrated in a plane at right angles to the paper. A screw on the end of the paper cylinder moves the platform by means of a notched plate or rack. 2nd. A "syphon pen" is so arranged in connection with an inkstand that the ink is supplied to the nibs of the pen continuously, the tube of the syphon being so small as to act by capillary attraction. 3rd. The syphon and pen are kept in a working position by means of an arm and India-rubber balls, one in the funnel of the inkstand, the other in the socket of the pen. 4th. A "double-armed standard," with a knife-edge bearing and set screw, regulates the tension of the armature spring. 5th. The armature spring may be kept in such a state of tension as to work rapidly with the slightest current, by means of a counter spring.

[Printed, 8d.]

A.D. 1859, September 19.—N° 2135.

ENGLER, Louis, and KRAUSS, Ernest Frédéric.—" A " new or improved system of insulators for electric wires."

This invention relates to insulators "for supporting telegraph " or other wires in the air," "and consists principally in the " application of a glass or crystal bush or fitting in which the " wire rests."

" This insulator is formed of a ring of malleable iron, or other " enamelled metal, presenting at the upper part a V-shaped " opening for the introduction of the wire. It is fixed by a stem " or arm to a plate or foot, which is fixed to the post by means " of two screws or bolts. In order to obtain a perfect insulator " indestructible by the rubbing of the wire," the said wire is deposited " on a bearing of glass or crystal, encased and fixed by " any suitable means in the eye of the ring, thus the wire can slide " freely on the bearing without wearing it, & without being " liable to lose the fluid it transmits."

When the telegraph wires are supported simply by being wound round the support, the arm is screwed at its end, and a glass bobbin is placed on it and secured by a nut. " The wire is held " on this bobbin by simply taking a turn upon it."

A form of insulator with the ring entire, instead of with a V-shaped opening, is described in the Specification and shown in the Drawings; this arrangement " is preferable for curved lines " where the wire pulls from the post, and where great strength is " required."

[Printed, 8*d*.]

A.D. 1859, September 24.—N° 2170.

DAFT, Thomas Barnabas.—" Improvements in coating metal " conductors suitable for electric telegraphs."

By this invention good adhesion between the conductor and the insulating compound is obtained.

The conductor is coated with brass and then with a sufficient thickness of India-rubber or India-rubber compound to form the cable; the India-rubber on the brass surface of the wire is then vulcanized. If strengthening wires are applied they are also coated with brass in order that the adhesion between them and the insulating compound may be perfect.

The conductor is preferred to be of copper, the coating of brass may be cast on, while the copper is in the ingot. If iron wire is used it may be coated with brass by electro-deposition.

India-rubber combined with sulphur is preferred to be used as the insulating compound. Besides the India-rubber coating, yarn may be applied in several layers with India-rubber between; the strands of yarn may be laid either longitudinally, helically, or both.

Instead of using round wire for the conductor, flat wire can be employed.

[Printed, 4*d*.]

A.D. 1859, September 29.—N° 2204.

ALLAN, Thomas.—"Improvements in applying electricity for "telegraphic purposes, and in apparatus employed therein."

1st. Improvements on the inventions set forth in Nos. 13,352 and 14,190 of the Old Law, "applicable to the step-by-step "motion, distant pole changers, and relays."

In one step-by-step dial-indicating instrument, the many-poled electro-magnet has eight poles; the compound permanent magnet vibrates on a vertical axis, and one of its poles is "placed "between each pair of the poles of the electro-magnet." The arbor of a single escape wheel, on the indicator axis, is pivoted in an upright hinged rod; the said rod is oscillated by means of an extension from one of the poles of the compound permanent magnet, so that the teeth of the escape wheel strike fixed pallets "alternately in such manner as to make the wheel to rotate, and "carry with it the pointer or index hand on a dial."

In another arrangement, the arbor of the escape wheel is pivoted into the end of the extension of the compound permanent magnet, and oscillates with it.

2nd. Constructing "distant pole changers or relays."

In one arrangement, a hollow permanent magnet is mounted on a centre between the poles of electro-magnets so as to complete local circuits by means of fixed stops against which the deflection of the permanent magnet takes place. To the axis that carries the permanent magnet a wire is fixed, and the said wire leads down to a mercury cup and dips into the same; "by this "arrangement in combination with the recording instrument "hereafter to be described, the evils arising from deflagration "in breaking contact are removed from the relay where the power

" is weak, to the break piece in the recording instrument, where " the power is strong enough to overcome its effects." Four electro-magnets with eccentric pole pieces, two to each pole of the permanent magnet, are employed in this arrangement.

In " another improved relay to produce the maximum of con- " tact effect from the smallest means or electric power," the number of poles in the permanent magnet are increased. The Drawings show a many-poled electro-magnet with eight poles, and a compound permanent magnet with 16 poles.

Another relay or pole changer consists of a lever armature acted upon, in a direct manner, by a many-poled electro-magnet; the armature is of soft iron, and the contacts are made by the counter-balance weight. In a modification of this relay the soft iron armature is supported by a reaction spring and its spindle moves vertically by means of guides.

3rd. " An improved recording instrument." The principal mechanism of this instrument consists of an electro-magnet with its lever armature, a wheel commutator and suitably placed springs, clockwork regulated by a small pendulum whose speed of vibration may be altered by a " regulating spring," and the printing levers with their springs. Alternate currents in the telegraphic circuit complete local circuits, by means of the first relay arrangement set forth under the 2nd head of this invention, and thereby actuate the electro-magnet. At every completion of the local circuit, a pall at the extremity of the lever armature shifts the wheel commutator into such a position that it breaks the local circuit, and makes it necessary for another line-wire current to deflect the hollow magnet of the relay against the other stop, before the local circuit is again completed. As one pole of the local battery is always in connection with the relay hollow permanent magnet, by means of the mercury cup, and the other local battery pole is always connected to the stops of the relay, the local current always circulates in one direction. A pall, hanging from the lever armature, winds up the clockwork which keeps feeding the paper strip to the printing levers at a uniform rate during the transmission of a message. There are two printing levers side by side, consequently there are two rows of dots on the paper strip; the said levers are actuated alternately, by means of pins placed on the click wheel that rotates the wheel commutator; the click wheel is on the commutator axis and is rotated by the pall of the electro-magnet.

4th. "An improved transmitting or sending instrument." In general detail this instrument is the same as the recording instrument. A suitably perforated strip of paper passes between rollers that answer to the feeding rollers of the printing machine; contacts are thus made with a local battery, so as to cause the electro-magnet to draw forward the paper, and at the same time to send alternating currents into the line-wire circuit by means of the wheel commutator, which is turned by a pall at the extremity of the lever armature, as in the printing machine. The wheel commutator or "reversing break" used in this instrument is similar to that set forth in N° 13,352 (Old Law), and consists of three metallic discs and four springs. The printing levers and their springs are dispensed with in the transmitting instrument, and a key is attached to the pall that revolves the commutator, so that the message may be sent by hand instead of by the paper strip.

5th. "A method of working the line by currents induced from "the electro-magnets of the sending and receiving instruments." In the instrument used for this purpose, the electro-magnets are much larger than those in the transmitting and receiving instruments already described, and they are placed "under instead of "between the cheeks of the instrument." In the case of the receiving instrument, a separate commutator or "break" is used, on the same arbor, "for alternating the induced currents, so that "the instrument can send or repeat the message on to a different "station if required." In this and in the 4th improvement, "the "break locks and stands with earth through relay, to allow of "speaking from the distant station without switching."

A printing arrangement, sometimes used in connection with the recording instruments, consists of a printing roller of carbonized paper placed between the drawing-through rollers and leading-off rollers.

6th. "A composing machine" to punch or perforate strips of paper for transmitting messages to be recorded by "an ordinary "relay and recording instrument." Transverse levers, connected with a series of punches, are operated upon by key levers corresponding to the letters of the alphabet; a single depression of a key produces "one complete letter properly spaced." The paper band is passed from a supply roller to a friction roller, thence along the top of the instrument to the cutting plate under the punches, and over a drawing roller to a winding roller. The blank or space

key is depressed at every letter, and acts, by means of levers and springs, upon a click and click wheel in connection with the drawing roller, so that at the raising of each letter key the paper is moved forward for punching the next letter. Dot and dash characters are sent by means of the paper strip.

7th. "A composing machine suitable for perforating paper," for the inventor's "improved relay and recording instrument "previously described." The keys and bars are similar to those of the composing machine described in the 6th improvement, "but instead of reading the spaces with the punched holes, and "drawing through the same length of paper for each letter," the inventor reads "the small punched holes sometimes divided by a "space," as in the inventor's dot alphabet, and draws through "paper equal only to the length of the letter." The paper-moving apparatus consists of click wheels rotated by means of a spiral spring, the said spring being only wound up a distance equal to what is required for the letter, by the action of palls and links attached to a "dividing lever," upon the above-mentioned click wheels. The "dividing lever" presses under the transverse bar, and is depressed a distance corresponding to the space occupied by the letter plus the space between consecutive letters.

8th. A perforating machine in which magnetic force is used "instead of the pressure of the finger to punch and throw "through the paper band." There is one electro-magnet to each punch; tubes (passing one through the other) are mounted on a central rod and carry the armatures of their respective electro-magnets at one end and the punch levers at the other end. The depression of a key makes the requisite contacts for the electro-magnets to be excited, according to the key depressed; it also depresses a "dividing lever" that acts upon click wheels in a similar manner to that set forth in the 7th improvement. When the finger is removed from a key, another electro-magnet is brought into action whose lever armature draws through the proper length of paper.

9th. "A break or sending instrument," suitable for breaking and reversing the primary current of the closed electro-magnetic induction coils described in N° 14,190 (Old Law). A commutator wheel, or "pin wheel," has alternate positive and negative copper pins round its circumference; two copper discs, respectively connected with the terminals of the primary circuit, are caused to rotate by the friction of the above-mentioned pins, thereby

cleansing the points of contact. A sending handle, acting upon a ratchet wheel, turns the "pin wheel," thus producing such secondary currents in the telegraphic circuit as to act suitably upon the relay and recording instrument described in the 2nd and 3rd parts of the present invention. "For every alternate motion "of the sending lever a line current is produced."

A "recording or check instrument," attached to the above-described sending instrument is set forth in the Specification and shown in the Drawings. The paper is carried by a rotating drum on a traversing rack; the rotation of the drum, to a suitable amount, is caused by clockwork whose spring is properly wound up at each motion of the sending handle. The axis of the drum is connected with the axis of the break by means of the said clockwork, and they both work loose upon the same fixed spindle. The printing levers of this instrument are worked by alternate side pins in the wheel commutator in a similar way to that described in the 3rd improvement. "By this machine it is im-"possible that the clerk can send any information to the distant "station without its being recorded against him."

[Printed, 2s. 10d.]

A.D. 1859, September 30.—N° 2217.

ATKINSON, Benjamin.—"Improvements in railway brakes."

One of the axles of a railway carriage has a screw cut upon its middle portion, and has an iron bar fixed parallel to itself on each side. On the frame thus formed a saddle plate is placed; the said saddle plate, in its inactive condition, is kept in the centre of its traverse along the iron bars by means of helical springs on the said bars. The saddle plate carries, on its under side, a moveable nut, made in two halves, for the above-mentioned screw to work in; on its upper side an electro-magnet and a "scroll plate" are fixed; the keeper of the electro-magnet is hinged to the "scroll "plate" by means of a small lever.

When an electric current is allowed to circulate round the electro-magnet, the attraction of the keeper causes the "scroll "plate" to close the screw upon the revolving axle, the whole saddle plate is thereby urged to one side or the other from the centre, and the system of levers connecting the saddle plate to the brake levers is thereby put into action; "the nut will continue to "move as long as the carriage rolls onwards, but every revolution "of the axle will cause the breaks to act more firmly until the

" whole is brought to rest." When the electric circuit is broken the nut is separated by means of a hand lever.

If the small lever is connected to a series of levers, electro-magnetic force may be dispensed with.

A subsidiary screw axle may be used instead of the axle of the carriage.

[Printed, 8*d.*]

A.D. 1859, October 5.—N° 2269.

MACINTOSH, JOHN.—" Improvements in coating metallic con- " ductors for electric telegraphs."

" Lampblack, napthaline, and gutta percha are combined into " a plastic compound, and the same is applied to wire or other " forms of metal conductors in like manner to that in which " gutta percha is now used; but it is preferred to employ such " compound as an external coating to gutta percha or other in- " sulating coating or coatings." The inventor also, in some cases, employs " a compound of india-rubber, or india-rubber and " gutta percha combined with lampblack, in preparing com- " pounds for coating metallic conductors for electric telegraph " purposes."

[Printed, 4*d.*]

A.D. 1859, October 7.—N° 2289.

M'CALLUM, DAVID.—(*Provisional Protection only.*) " Improve- " ments in electric telegraphs."

This invention " consists in marking thread, yarn, string, cord, " or other suitable flexible material with consecutive transverse " marks of ink or other marking material by the aid of apparatus " put in motion by electro-magnets, or other suitable electric or " magnetic apparatus."

The thread is wound off one reel on to another, either by clock-work or by an electro-magnetic arrangement, and, in its passage, it receives the marks by being deflected against a ridge or ridges charged with ink, the deflections being accomplished by means of a " finger " affixed to the keeper of an electro-magnet.

This invention may be used for the purpose of recording telegraphic train signals on railways. In this instance, various coloured marks may be used to denote messages from various stations.

In time signals, the intervals of time are indicated by distinctive blank spaces left on the thread.

When this invention is used for general purposes, the marks may be distinguished into long or short, according to any agreed code of signals, by transmitting the electric current for a longer or shorter time.

"Two or more threads or lengths of material may be marked at " one time to obtain several copies of the register if desired."

[Printed, 4d.]

A.D. 1859, October 17.—N° 2372.

BROOMAN, RICHARD ARCHIBALD (*a communication from Messrs. J. S. Rousselot and Company*). — " Improvements in " electro-magnetic engines, and in apparatus connected there- " with."

Two sets of electro-magnets are fixed in a vertical position to a base plate, one set on each side of a central shaft. The electric current is admitted to the coils of each set of electro-magnets alternately, thereby vibrating the said shaft by means of rocking levers centred on the shaft, and carrying the armatures of the electro-magnets at their extremities. The rocking motion of the shaft gives rotary motion to the fly-wheel axle through a system of levers.

The successive armatures are made to slide upon rods, and are situated at gradually increasing distances from their respective electro-magnets; this arrangement, in conjunction with the magnetization of the electro-magnets in succession, causes the rocking shaft to have a large arc of vibration, by a series of short strokes made in succession by the armatures of the electro-magnets.

The levers communicating rotary motion to the fly-wheel or crank shaft consist of an arm keyed on the rocking shaft connected to a system of "jointed levers or lazy tongs;" one end of the jointed levers is jointed to a fixed arm, the other end to the connecting rod of the crank shaft.

Hollow arms, attached to the fly wheel, contain a quantity of mercury for the purpose of adding to its effect.

A fixed wheel commutator has an arm on the fly-wheel shaft traversing over it to make the requisite electrical contacts.

At the end of the action of each electro-magnet, a reversing apparatus destroys the residual magnetism.

[Printed, 8d.]

A.D. 1859, October 20.—N° 2402.

GODEFROY, Peter Augustin.—The title of this invention is "Improvements in the construction of submarine cables."

The inventor states:—"My invention consists in covering the "wires of submarine telegraphs in a more perfect manner than "heretofore, and is as follows:—I propose covering or insulating "single or combined conducting wires with a coating of gutta "percha or india-rubber or a combination of the two materials, "or with a coating of compound gutta percha (patented by me "on the 4th day of June 1855, No. 1268) the thickness of which "is to be regulated according to the size of the cable to be manu-"factured; the wire or wires being thus covered I take them to "my insulating machine (patented by me on the 26th day of "July 1858, No. 1687) in the front of which are a number of "reels containing fine steel or iron wire as may be required "sufficient to completely cover the insulated conductors, and "placed around them in a parallel line, these outer wires are to "be covered with any suitable material of a light texture "according to the size or construction of the cable, the outer "wires being always placed in a straight or parallel line with the "conducting wires."

[Printed, 6d.]

A.D. 1859, October 22.—N° 2419.

BEARDMORE, Septimus.—(*Provisional Protection only.*) The title of the invention is "Improvements in electric telegraphs."

The inventor states:—"I propose to effect an improvement on "the present methods of constructing electric telegraphs by a "novel manner of generating the electricity employed to work "them. I make use of the voltaic arrangement of a single pair "of positive and negative substances, the positive metal or sub-"stance being in electrolytic connection with the earth at one "station, and the negative metal or substance in similar con-"nection with the earth at the other station, and the usual "conducting telegraph wire between the stations connecting "them. I cause one or both of the positive and negative metals "or substances to rotate in a solution which is in electrolytic "connection with the earth, and by this means I obtain an "increased tension or electro-motive force. I am aware that the

" use of a single pair of plates in the earth has been before " patented under different forms by Bain, Highton, and also by " Messieurs Hoga, Piggott, and myself, and I disclaim the " methods of arrangement pointed out in these Patents; but I " claim as new the method herein described of generating elec- " tricity for the purposes of telegraphy by the rotation of one or " both of the positive and negative metals (connected as a single " galvanic couple) in a solution which is in electrolytic con- " nection with the earth."

[Printed, 4d.]

A.D. 1859, October 25.—N° 2433.

ROSSER, Henry Shepherd. — "Improvements in electric " telegraph cables, and in the mode of obtaining signals."

In this invention, a portion of the wire of the cable forms "one " of the elements in the voltaic arrangement."

1st. "The construction of a cable composed of two or more " wires partially insulated, each wire to be twisted in a very long " spiral around a small cord;" the cord and wire so worked " together shall be afterwards laid or worked into a strand of " hemp or other fibrous substance (or the wire may be simply " laid without twisting)," which "shall be saturated with tar or " any substance which will tend to preserve it from the corrosive " action of the sea water." The partially insulated electro-negative wires above mentioned are attached to a recording instrument at the receiving station and the end of either of the wires at the sending station is brought into contact with a portion of zinc in the earth or water. By having zinc plates at both ends of the line, and apparatus for making the requisite connections, signals can be sent in either direction.

If the same cable carry four electro-negative wires (preferably coated with platinum) two separate circuits can be established and " signals can be sent both ways at the same time."

2nd. Round or along an insulated core of gutta-percha-covered wire, one, two, or more wires may be twisted or laid so as not to come into metallic contact with each other. In the case of one insulated and one uninsulated wire, the terminals of uninsulated wire are always connected to the receiving instruments, and those of the insulated wire are removeable from the receiving instru-

ment to a zinc plate in the earth, when it is required to send a message.

[Printed, 8*d.*]

A.D. 1859, October 25.—N° 2440.

HURRY, Henry Columbus.—(*Provisional Protection only.*) "Improved apparatus for applying or using magnetism or electro-"magnetism as a motive power."

"A number of horse-shoe or other magnets are fixed in a "cylinder or barrel in such a way that their poles or ends are "exposed on the outer surface of the cylinder, the line of the "poles of each magnet being parallel or thereabouts to the axis "of the cylinder. The magnets are so arranged that when the "cylinder revolves freely upon its axis, the magnets shall be in "one or more tiers; the magnets of each tier being in the same "plane; around the cylinder or barrel is placed a fixed cylindrical "frame containing a number of magnets with their poles or ends "so exposed that the ends or poles of the magnets of the re-"volving cylinder will closely pass them without contact." "Both the moving and stationary magnets should be so placed "or formed that the surfaces of their ends or poles shall not be "tangential to the circumference of the cylinder. The number "of magnets in the moving cylinder should differ from the "number in the fixed frame, so that only a part are exactly "opposite to each other at the same time; either the moving or "the stationary magnets must have their poles constant and "arranged alternately, and the polarity of the others must change "as they pass or are passed by the opposing magnets."

If the change of polarity take place in the moving magnets, a wheel commutator is used in which the inlaid metallic pieces are fixed, and the springs moveable.

[Printed, 4*d.*]

A.D. 1859, October 26.—N° 2449.

PRICHARD, John Lewis.—"A new method of relieving pain "in the human body," in which electric force is employed.

"This invention consists in the use of alleviative drugs in com-"bination with a battery to act upon the various parts of the "human body wherein pain may be seated, such as rheumatism,

" paralysis, nervousness, indigestion, chronic deseases, first stages " of consumption, deficient circulation of the blood, coldness of " the extremities, and other local pains, said drugs being well " known to the faculty. These drugs such as opium, chlorate of " potash, and other alleviative drugs, to suit the nature of the " complaint, are to be applied or thrown into the blood, or " applied to the parts affected, by means of a battery or batteries, " and insulated wire, placed in such a form as to aid the unifor- " mity of the current, by which means the fluid is applied in one " continuous current." "The several methods of application " and quantities being determined by the practitioner, according " to the nature of the complaint, and the part where such com- " plaint is seated."

[Printed, 4*d*.]

A.D. 1859, October 27.—N° 2454.

ZACHERONI, Ignazio.—(*Provisional Protection only.*) The title of this invention is "Improvements in electric telegraphic " cables for submarine and subterranean uses, and in submerging " the same."

The inventor states:—" My invention consists of an arrange- " ment of materials or substances by which electric telegraphic " cables are made to contain in small space several conducting " mediums combining strength, lightness, and pliancy, with an " addition or application allowing the same to be submerged with " perfect safety. The core or centre is made of hemp, flax, or " other vegetable fibre twisted into a rope or cord; running " longitudinally with this rope are the conducting mediums, " made of copper or other metal, and consisting of one or more " wires insulated by or firmly imbedded in gutta percha or like " substance; outside of these are placed a sufficient number of " ropes made of a vegetable fibre placed either parallel with or " spirally round the conductors; the whole to be coated with " gutta percha or similar non-conducting material. The vege- " table fibres may be covered with bees-wax. I purpose paying " the cable, afore-described, from vessels by the machinery already " used for that purpose, but at distances, varying according to " the depth of the ocean, are to be attached pieces of cork to " assist in supporting great lengths."

[Printed, 4*d*.]

A.D. 1859, November 3.—N° 2503.

SIEMENS, Charles William (*partly a communication from Werner Siemens*).—" Improvements in insulating electric tele-" graphic conductors, and in battery arrangements connected " therewith."

1st. Insulating electric telegraphic conductors with India-rubber or vulcanized or " hornified " India-rubber.

In insulating wires, the India-rubber is applied "in strips " whose edges are cut and the freshly cut surfaces united by " means of grooved rollers and cutting edges." Two machines for this purpose are described and shown; in one, the cutting rollers are nearly tangential to the seam, in the other they cut or shear nearly at right angles to the seam. When two or more successive coatings are applied, they are placed " so that the joints or seams " of the india-rubber may come " " in different angular positions, " by means of two or more machines placed in succession with " the grooved rollers of each machine at an angle to those of the " preceding machine." The wire may be passed through a gas flame to cause the adhesion of the coating to it. Two or more wires may be coated " simultaneously with india-rubber, by passing " the wires and two broad strips of sheet india-rubber between " two or more grooved rollers and shearing discs, placed alter-" nately upon one spindle and similar grooved rollers, with or " without soft or elastic intervening discs placed upon a second " spindle." The conducting wire " may be used plain, or it may " be previously coated with collodion or shellac or other suitable " varnish." A coating of hemp or other covering may be bound or placed over the above-described India-rubber covering; when hemp is used, it is poisoned, " by forming within its substance a " precipitate of sulphuret of zinc or copper, or arsenic, or other poisonous metal."

This portion of the invention is adapted to insulators for suspended line wires by partly encasing and insulating their metallic stalks " by tubes or coverings of hard vulcanized or hornified " india-rubber, which tubes or coverings are either manufactured " separately, or are manufactured or completed on the said stalks, " and are inserted or cemented in bell-shaped cups of cast iron " or other suitable material."

Insulators for suspended line wires are secured " to insulating " supports by means of a bent plate or rod with two hooks and a

" wedge or screw, by which the wire is held between two points " on one side and one intermediate point on the other side." The method of attaching insulators, described in N° 512 (A.D. 1859), is alluded to in this Specification.

2nd. Voltaic battery arrangements connected with electric telegraphs.

A double-fluid voltaic battery is constructed "with an upper " chamber or compartment containing the zinc element, and a " lower chamber containing the copper element, and separated " from the upper chamber by a thick layer of paper pulp, saw- " dust, or other porous material." The said battery is "provided " with a cylinder or funnel of impermeable non-conducting " material, by means of which the crystals of sulphate of copper " or other materials or solutions can be introduced into the lower " chamber."

"A polarization battery" is made by connecting a series of vessels containing dilute sulphuric acid by means of wires and platinum plates, two plates being in each vessel, and each plate being connected in series, as in a galvanic arrangement, except that the plates are all of one metal. The reflex current from this arrangement is used to increase the effect of weak currents on the receiving instrument.

[Printed, 1*s.* 6*d.*]

A.D. 1859, November 4.—N° 2516.

HILL, William.—(*Provisional Protection only.*) " Improve- " ments in lightning conductors."

" In constructing lightning conductors, according to this " invention, they are made either in parallel or taper pieces of " convenient length, and the sizes to diminish from the bottom " upwards; the pieces or sections of the conductor are each made " either solid or tubular, and they are connected the one to the " other by screws or other convenient means. A projection from " the end of the one piece or section, on which an external thread " is cut, screwing into a socket having a corresponding internal " thread at the extremity of the other piece or section; the lower " end of the conductor fits into a suitable socket bedded in the " earth, and is continued several feet below the surface. Con- " ductors constructed in this manner should be erected at a short " distance from the building they are intended to protect, and

" they do not require any stays, as sufficient stability is obtained
" by making the conductor to taper as above explained."
[Printed, 4d.]

A.D. 1859, November 5.—N° 2521.

JOY, David (*a communication from Charles de Bergue*).—(*Provisional Protection only.*) " Improvements in machinery for " the manufacture of telegraphic cables."

This invention has reference to " the formation of cables already " the subject of existing Letters Patent " [N° 1605 (A.D. 1858)?] " consisting of a series of longitudinal strands around a gutta " percha core enclosing the electric conductor, the whole being " payed over with a binding."

" The said invention consists in constructing machinery to lay " or pay two or more strands, wires, or coverings simultaneously " or at one operation, side by side of and close to one another, " over or around the parts so to be bound or covered, in such " manner as to place them like a flat band, around such parts, or " otherwise to lay or pay an already manufactured flat band or " bands, or covering over or around such parts, by winding the " binding by means of and from off bobbins carried around the " parts to be covered. The effect of the machinery being to bind " or cover the parts required more rapidly, or with a less number " of rotations than if a single round binding strand only were " laid at one rotation, and further in constructing the machinery " with a self-acting stopping motion, which will take effect in the " event of the binding, or part or parts thereof becoming broken, " and also in constructing the machinery so as to draw the cable " in process of manufacture through itself, and to deliver it out " of or away from itself by means of grooved gripping rollers " driven at the requisite speed."
[Printed, 4d.]

A.D. 1859, November 9.—N° 2546.

HAMER, Job.—This invention " consists in the use, application, " or adaptation of any suitable kinds of waste or refuse silk for " preventing or impeding the transmission of the electric fluid or " of heat in certain cases."

In applying this invention to the insulation of the line wires of electric telegraphs " silk noils and winders' or weavers' waste "

are reduced "into the form of a coarse yarn or hard twisted "roving." The said yarn or roving is applied to the wire "by "winding it round the wire in close successive coils;" or the said yarns or rovings may envelope the wire "in the manner of "braiding or plaiting, according to the method and by the "machinery" described in N° 12,991 (Old Law).

The "hard twisted roving" above mentioned may be obtained by subjecting the silk waste "to the process and machinery" described in N° 3145 (A.D. 1857); "machinery adapted to the "treatment of long stapled fibre" is used to rove "the slivers "so obtained." In roving, "the speeds of the front rollers and "flyers of the roving frame" are modified "so as to put in extra "twist."

The coarse yarn may be obtained by roving "the material in "the usual manner," and then spinning it "into coarse yarn "upon throstles on the 'long ratch' principle."

In the application of this invention to the insulation or protection of submarine or other electric telegraph cables, the strands of yarn or roving used are "of stouter dimensions in proportion to "the thickness of the cable or rope of wires."

[Printed, 6*d*.]

A.D. 1859, November 9.—N° 2552.

CLARK, William (*a communication from Mr. E. D. Rosencrantz*).—"Improvements in the construction and application of "electric telegraph wires or conductors."

"These improvements in telegraph wires consist in the employment of a compound wire, such as a silver central wire, and "an outside casing of copper or any other metal as a centre, "having a greater conductive power than the outside." By this improvement "an increase of conducting property is given by said "centre, as it tends to centralize the current and to prevent its "dissipation in long circuits."

The compound wire is formed "by melting the silver in a "previously formed hollow ingot of copper heated; by this course "a union of the two metals takes place, thus forming a compound "metal at their junction of a high conducting power." After cooling, the compound ingot "is subjected to the ordinary process "of wire-drawing by which the copper and silver centre are elongated, a perfect and complete union of the metals having taken "place."

" In drawing wire a direction is given to the fibre or lamina so " that they overlap in conical sections." In placing the wires of a telegraph, advantage is taken of this peculiarity, and " by " selecting the rear end of the wire in a coil " as the " connection " end so that the current through it shall take the same direction " that the wire did in passing through the draw plate, the current " may be thus kept more in the centre of the wire."

[Printed, 6d.]

A.D. 1859, November 10.—N° 2559.

SEYMOUR, George.—" Improvements in insulating and pro- " tecting electric telegraph conductors."

This invention " consists in the application of animal hair or " other animal fibres when insulating electric telegraph wires or " conductors. For these purposes the wires or conductors may " be first coated with gutta percha or india-rubber, or mixtures " of these substances, or with other insulating matter; and it is " preferred that the hair or other animal fibre should not be used " in the first coating, though it may be applied therein; or the " hair or other animal fibre may be applied directly to the surfaces " of the wires or conductors, and such application may be by " mixing the hair or animal fibres with the gutta percha or india- " rubber, or varnish or adhesive matter; or such hair or animal " fibres may be made up into felt, or yarns, or cords, and applied " to the surfaces of the metal conductors, or after such surfaces " have been coated with other insulating matter. And when ap- " plying hair or other animal fibres to the insulating and pro- " tecting electric telegraph wires or conductors, wires or strands " of wires may be used to give greater strength, as has heretofore " been done."

The inventor prefers " to use the animal fibre felted into sheets " or narrow strips," which are wound " in a spiral direction " around the previously insulated wire or conductor, so that the " edges of the strips of felt overlap each other."

[Printed, 4d.]

A.D. 1859, November 14.—N° 2581.

BROOKS, Charles Henry.—" Improvements in apparatuses " for paying-out and hauling-in telegraph cables."

1st. The cable is passed " over a spiral drum or apparatus, of

" which the radius of curvature varies, being least at the point " where the cable reaches the apparatus and greatest where it " leaves it." "The spiral or any portion of it may be either " fixed rigidly, or it may be arranged with springs, &c. so as to " have a certain latitude of motion either vertically or hori- " zontally."

2nd. Instead of the above-described "spiral drum," "a spiral " groove or channel cut along the surface of a cylindrical or " conical drum, or formed by flanges thereon," may be used. Axial rotation is permitted to the drum when a certain strain upon the cable is exceeded.

3rd. The cable may pass on or between endless belts, "but " always in such manner that when the pull of the cable exceeds " the desired amount the cable is free to slide along the belt or " belts without imparting to it or them any increased rotation."

4th. "The use of a cylindrical drum attached to its axis by " means of any suitable friction strap or apparatus in such manner " that when the pull of the cable exceeds the amount of friction " of this apparatus, the drum is free to revolve without increasing " the rotative velocity of the axis."

" The whole of these methods, except the first are applicable to " raising as well as to laying cables by connecting them with a " small steam engine or other source of power, and then reversing " their motion."

[Printed, 4d.]

A.D. 1859, November 15.—N° 2591.

WARD, WILLIAM HENRY.—(*Provisional Protection only.*) The title of this invention is "Improvements in tanning hides and " skins."

The inventor states :—" The object of this invention is the tan- " ning of hides and skins by a more speedy and efficient process " than heretofore, in suitably arranged vats or tanks, by the aid " of electricity, and is effected in the following manner :—I pro- " pose employing vats or tanks of the ordinary or other suitable " construction, the same being lined with india-rubber, cloth, or " other non-conducting substance. These vats or tanks are filled " with tanning liquor, and the hides or skins suspended therein, " and an electric current applied by means of a suitable battery. " The effect of this is, that the electric current passes through the

" whole of the contents of the vats or tanks, and the tanning " process instantly commences and continues so to do until the " strength of the liquor is absorbed, when (if desired) fresh liquor " may be added, and the current again applied.

" By this means hides and skins may be fully and effectually " tanned in the space of a few hours."

[Printed, 4d.]

A.D. 1859, November 28.—N° 2685.

TOMEY, ENOCH.—" Improvements in apparatus for insulating " telegraphic wires or conductors."

This invention relates to insulators that are used to support line wires upon posts in the air.

It is preferred to make the insulators of glass. Each insulator consists of a short bracket piece " formed with a screwed pin for " screwing into the telegraph post." " Between this pin or stud " piece is a shoulder or collar to provide a good bearing against " the main support, and above this is a thick flat head or bearing " piece for carrying the telegraphic wire; this head piece is formed " with a wide hole transversely through its centre, a transverse " slot being formed in the head so as to allow the wire to slip " through down into the bearing recess when adjusted in position. " This slot may be formed either in line with the aperture for the " wire, or, as is preferred, at a slight angle with such axis."

The Drawings show the above-described insulators fixed as standards on laterally projecting branches from the telegraph post, also fixed as brackets to the post itself; in each case the slots are vertical. One insulator is shown with the slot inclined " in a " diagonal direction."

" Although the entering slot is most advantageous, in as far as " it admits of such facilities for adjustment, the improved insula- " tors may be made with a simple bearing hole through them, but " in this case the wires must necessarily be threaded into the " insulators."

[Printed, 8d.]

A.D. 1859, November 30.—N° 2710.

DE MATTHYS, HIPPOLYTE.—" Improvements in electric tele- " graph cables."

" The core of the cable consists of an ordinary wire of copper;

" this wire is to be coated or covered with gutta-percha, over and " around this coating iron wire is to be wound; this wire is to be " covered with a coating of gutta-percha; over and around this " last-named coating a fourth envelope or covering of iron wire is " to be wound as before; over this another coating of gutta " percha is placed, and upon this last-named coating one, two, " or more layers of tarred ropes are laid side by side, parallel or " lengthwise of the cable, and lastly, over and around these said " ropes another covering of tarred rope is wound tightly in a " helical direction."

[Printed, 6d.]

A.D. 1859, December 1.—N° 2718.

MOSSELMAN, ALPHONSE.—(*Provisional Protection only.*) " An aromal electric girdle."

" This electric girdle is intended to protect those who wear it " against sea sickness; it is made of Russian leather, and pro- " vided with an electro-galvanic battery, composed of a copper " box or case half filled with zinc filings, into which two positive " and negative electrodes enter, forming both ends of a circuit of " copper and zinc; flattened spiral wires are lodged under the " leather. For setting the said battery into action a few drops of " sea water are introduced into the copper case."

[Printed, 4d.]

A.D. 1859, December 6.—N° 2757.

COIGNET, FRANÇOIS.—" Improvements in the manufacture of " beton or composition applicable to purposes of covering, build- " ing, and construction, and for various uses, as artificial stone," which are applicable (amongst other uses) to " continuous protec- " tive coverings for telegraph wires."

The " chief principle " of this invention consists " in the theory " that the quality of lime betons depends on the crystallization " of the lime and not on chemical combinations, such crystal- " lization being brought about by dispensing with a large propor- " tion of the water usually employed by sustained and forcible " crushing and pressing admixture which induces a firm plastic " pasty condition, and by agglomeration."

The lime is brought into a suitable condition for carrying out this invention by taking it partially slacked in a state of powder, then completely slacking it and bringing it into a pasty condition

" by crushing or grinding it with a very small quantity of water " by forcible and sustained mechanical means before adding any " other ingredient." Sand, earth, and natural or artificial puzzolana may be used, as absorbents, to mix with the lime to form the beton. The sand is, prior to use, to be desiccated either by natural heat or by passing through it currents of hot air. The ingredients are pressed, crushed, and mixed together at one operation by means of suitable machinery. Double-headed nails and other irregular fragments or pieces of iron may be introduced into the mass of the composition, when desirable, as binding agents.

[Printed, 6*d*.]

A.D. 1859, December 6.—N° 2759.

SHAW, JAMES.—" Improvements in the insulation and laying " down conducting wires for the transmission of telegrams or " telegraphic messages."

This invention " consists in insulating and laying down wires " for telegraphic purposes by means of insulating rests, props, or " supports at suitable distances apart, and notched or curved or " hooked with open notches, curves, or hooks, also at suitable " distances apart, for the purpose of receiving, supporting, insu- " lating, and holding, separate and apart from each other, a " number of underground or surface of the ground, naked and " uncovered telegraphic conducting wires, or wires covered with " an insulator for the transmission of telegrams or telegraphic " messages, the said wires being extended on the rests in troughs " or tubes made water-tight, and suspended between rest and " rest in the air on the same principle that telegraphic conducting " wires are extended on poles and suspended in the open air."

Glazed earthenware troughs with glazed rests are preferred. The troughs are joined by socket joints, and the lid fits into a longitudinal groove in the trough, so that when a mixture of gas pitch and coal tar is poured over the joints, the trough or series of troughs is water tight.

Standards with drums for stretching the wires previous to placing them or fixing them in the troughs are shown in the Drawings.

When necessary, for perfect insulation, the troughs or tubes are filled with the above-mentioned insulating and protective mixture whilst it is in a boiling state.

[Printed, 1*s*.]

A.D. 1859, December 6.—N° 2764.

POTTS, Ferdinand.—" Improvements in the mode of manu-
" facturing or finishing tubes for certain purposes."

This invention consists in coating brass, iron, or other boiler tubes with copper by means of "any of the approved and most " economic modern methods of electro-depositing; and as copper " so deposited is found to be in a crystalized state, or, in other " words, deposited in small grains or particles," it is proposed to draw "such tubes through a smooth steel finishing hole of the " proper size in the same way and by the same appliances in which " such tubes may have been originally made or formed."

This process may also be applied to the tubes of tubular condensers. In this case, after cleaning and pickling, they are drawn " through a hole sufficiently small as to compress the entire outer " surface of the tube concentrically with the steel surface of the " hole, thereby producing a uniform smooth surface;" the tubes are again cleaned, electro-coated, and again drawn through a hole.

This mode of finishing tubes is also proposed to be applied " for the hand-railing and other parts in and about locomotive " and marine engines and other fittings where great strength is " required, and where, on account of the expense, stout iron or " iron cased tubing has been hitherto used."

[Printed, 4d.]

A.D. 1859, December 10.—N° 2809.

CHATTERTON, John, and SMITH, Willoughby.—" Im-
" provements in insulating telegraphic conductors, and in the
" treatment of gutta percha."

The conducting wire is covered with gutta percha, India-rubber, or other insulating material, it is then placed in a close vessel, and the air is exhausted therefrom; the minute pores in the gutta percha or other covering are thus emptied as completely as possible. Insulating liquid is forced with considerable pressure into the close vessel, thus filling up the said pores.

In some cases the pores of the gutta percha are closed "by " submitting it when in a thin sheet or in a divided state to a " process such as above described."

Gutta percha is prepared "for use for other purposes by filling

"its pores in the manner above described with a preservative "liquid, which will preserve the gutta percha from decomposition "when exposed to air."

To obtain perfect union between the several gutta percha coverings of telegraphic wires, as the wire "passes to receive an "additional covering, it is drawn through a flame to heat and "soften the surface with which the additional covering is re-"quired to unite. A composition is also employed to render "the union between the two coverings more complete, as is now "ordinarily practiced."

In order to cool the gutta-percha-covered wire it is passed "into "a tank of an insulating liquid in place of into water, as hereto-"fore."

The "insulating liquid" and "preservative liquid" employed to carry out this invention is fluid Stockholm tar.

[Printed, 4d.]

A.D. 1859, December 15.—N° 2857.

HANCOCK, Charles.—"Improvements in insulating tele-"graphic conductors, and manufacturing cables for telegraphic "purposes."

This invention consists of applying vulcanized India-rubber "on the wire or other conductor for insulating purposes." The conductor is passed through vulcanized India-rubber tubes, which are retained in place by binding or braiding them with twine. Tapes or threads of vulcanized India-rubber may be bound round the wire, either helically or longitudinally, and then fixed in position by binding or braiding them with tapes or threads. "The "tubes, tapes, or other binders before being applied on the wire "may, if required, be coated with a cement or solution, in order "to give adhesive property to the surface."

So far as this invention relates to the passing of wires through vulcanized India-rubber tubes, it "may be applied to wires or "other conductors which have been previously coated or covered "with other insulating material or materials, and other insulating "materials may be placed upon wires and other conductors which "have previously been insulated" by any of the means described above.

[Printed, 4d.]

A.D. 1859, December 19.—N° 2886.

PELLISSIER, Louis, JANNESSE, Jules, and CASTILLON, Edouard.—(*Provisional Protection only.*) "An improved brake " for railway carriages, and mode of transmitting signals for " working the same."

" This improved brake consists in applying to the ordinary skid " brake apparatus of railway carriages a spiral or other proper " spring of sufficient strength and acting in such manner that by " the unbending of the spring the brake may be caused to act " with great rapidity and force." In ordinary circumstances, when the common brake apparatus is sufficient, a clutch prevents the above-mentioned spring from acting. The contrary action to that which causes the skids to act obliges the spring again to be bent. " Each carriage of a train must have its own brakesmen."

The principal feature of this brake " consists in having two " skids applied to each wheel, and causing the skids of all the " wheels of a railway carriage to apply itself simultaneously " against the periphery of their respective wheels."

" For allowing the engine driver instantly to communicate with " the brakesman, the engine or tender is provided with a *galvanic* " *battery* connected by isolated wires or other proper means, with " alarums situated on the carriages; by which means the driver " may consequently transmit the required signals to the brakes- " men."

[Printed, 4*d.*]

A.D. 1859, December 21.—N° 2912.

ABBOTT, William (*a communication from James Campbell Francis Calvert*).—(*Provisional Protection only.*) " An improved " method of preserving timber, particularly adapted for railway " purposes."

" This invention relates to the preserving of timber from wet " or dry rot, insects, and other such like injuries to which timber " is susceptible, in a more economical, simple, and efficient manner " than heretofore, and is particularly adapted for railway and " building purposes. The timber which, in preference, is to be " the 'pitch pine,' or other timber containing resinous matter is " to be cut the desired length and size, and then subjected to " heat by means of roasting, baking in ovens of any suitable

" construction, or steam, which has the effect of bringing a por-
" tion of the resinous matter to the surface, and forming a hard
" coat or crust, at the same time drying the sap within the wood,
" thereby adding to its strength, and preventing any absorption
" of moisture.

" This process being well adapted for railway sleepers, *telegraph* " *posts*, and all building purposes."

[Printed, 4*d.*]

A.D. 1859, December 23.—N° 2922.

MENNONS, Marc Antoine François (*a communication from Hippolyte F. P. Benoist*).—" Improvements in voltaic batteries."

1st. "The employment in voltaic batteries of slightly soluble " metallic salts." Sulphate or chloride of lead is preferred, but, when it is desirable to keep the zinc properly amalgamated, sulphate of mercury may be used, either alone or in combination with the lead salts. Common salt or sulphate of zinc may be added to the paste formed by the slightly soluble salts. The paste is placed next to the negative plate.

2nd. "The combinations of battery apparatus in which these " salts are used." The simplest form of a "column battery," which comprises these improvements, consists of "shallow cap-" sules in zinc, tinned inside, nested one within the other (without " metallic contact), and maintained in position by brackets fitted " to a non-conducting support;" on the tinned bottom of each of these capsules is placed a layer of sulphate of lead, "over which " is poured any suitable exciting solution." Earthenware troughs (with porous bottoms) in which shallow tinned copper vessels rest, may be used, each copper vessel having a zinc plate at its bottom. For energetic currents, a carbon-zinc arrangement is described and shown. A "column battery" for telegraphic purposes consists of copper vessels containing a plate of zinc and a porous diaphragm with the necessary insulations and connections. In a single cell medical battery, the salt of lead is placed in a metallic capsule at the bottom of the exterior copper vessel, and the whole is covered. Another single cell arrangement is similar to a Daniell's battery, the negative plate or rod being in the porous cell.

[Printed, 8*d.*]

A.D. 1859, December 28.—N° 2956.

MAGNUS, Lazarus Simon, and SINNOCK, William.—"Improvements in preparing yarn, twine, cords, and strands, or "other fibrous materials to render the same more suitable for "submarine telegraph cables and other uses."

"This invention consists in saturating yarn, twine, cord, and "strands of hemp or other fibrous material with a composition "consisting of india-rubber, gutta percha, resin, tar, pitch, or "similar substances, with vegetable or other wax. It is preferred "that the process of saturation should be performed on the "fibrous material when in the state of yarn or twine, and that "when the same has been thoroughly saturated, it is distended "and held in such condition till set, by which a non-contracting "yarn or twine is obtained. It should, however, be stated that "the process may be performed on the fibrous substance when in "the state of cords or strands.

"The solution above described is used by preference at a tem-"perature of 220° (Fahrenheit's thermometer), and the yarns, "twines, cords, or strands are retained therein till thoroughly "saturated. The yarns, twine, cords, or strands are then stretched "and kept distended till set, when the same will be in a condition "to be employed in the manufacture of submarine electric tele-"graph cables and other uses where non-contracting yarns, twine, "cords, or strands of hemp or other fibrous substances are "desired."

The principal feature in this invention is the use of vegetable or other wax, in combination with the above-mentioned substances, for the purposes set forth.

[Printed, 4*d*.]

1860.

A.D. 1860, January 5.—N° 28.

HORWOOD, Albert.—(*Provisional Protection only.*) "Im-"provements in signalling by electricity, and in apparatus con-"nected therewith, adapted to communicating between railway "stations and railway trains, and also applicable to other pur-"poses."

The signals "caution," "clear," and "danger" are conveyed from the engine to the station by means of electrical contacts made by the engine in passing certain portions of the line. These contacts may either be made by a deflecting "crook," on the top of a post and a ring on the engine, or by a galvanized iron bar at the side of the rails and a "metal pendant" on the engine.

The instruments at the station consist of an alarm and a pole changer. "The latter instrument is provided with two extra con-" tact springs placed for the purpose of forming certain contact " with either pole of the battery. On the exterior of this in-" strument is shown in colors the signals 'caution,' 'clear,' " and 'danger,' and a contact lever is keyed on the barrel for " communicating the same." The galvanometer indicator is on the engine, and is suspended from its exterior case entirely by means of India-rubber springs. A small magnet is used to retain the needle "in the position in which the current deflects it after " the contact is broken;" the said magnet has sufficient power to retain the needle against its tendency to return to a vertical position, but not sufficient "to interfere with its motion when " actuated by the electric current." "An insulated stud or " thumb-piece" releases the needle when desired.

[Printed, 4d.]

A.D. 1860, January 6.—N° 47.

HOOPER, WILLIAM.—(*Provisional Protection only.*) "Im-" provements in re-working compounds of India-rubber and " sulphur, and in insulating telegraphic wires or conductors."

In re-working compounds of India-rubber and sulphur, they are reduced to a pulp "by grinding them with naptha or " solvent," and to this mixture raw India-rubber and sulphur is added; the mixture is moulded and then "exposed to heat to " cure it."

In coating copper wires with compounds of India-rubber and sulphur, the wire is coated with a non-adherent layer of copper or other metal before applying the compound containing sulphur. " A layer of paper or fibre saturated with tannate of gelatine, " tannin, and collodion, or tannin and shellac combined or sepa-" rate," may be interposed between the two metals. The collodion and tannin compounds may be used to separate the copper wire from the India-rubber compound, and the whole may be sub-

jected to heat to vulcanize the India-rubber; ordinary India-rubber, or cotton, or fibre may be used for the same purpose. Before vulcanizing the coating, it may be covered with strands of fibre or wire.

In making joints in electric telegraph conductors that are coated with vulcanite or vulcanized India-rubber, the ends of the wires are first soldered together, a narrow fillet of pure India-rubber is then wound helically round the wire, an unconverted sulphur compound of India-rubber is applied round this helical covering, and a sheet of vulcanized India-rubber is placed over the whole; heat is applied, and the unconverted sulphur compound of India-rubber is the cementing agent.

[Printed, 4*d.*]

A.D. 1860, January 10.—N° 64.

VERGNES, MAURICE.—" Improvements in galvanic batteries."

This invention consists of " an improvement on the Grove and " Bunsen battery."

The battery which is the subject of this invention consists of three vessels, one within the other, an outer one of zinc (amalgamated in its interior and varnished on its exterior surface), an intermediate one of porous porcelain, and an inner one of glass. The glass vessel " is open at the bottom, and has at its top a " stopper, which closes hermetically, and which can be removed " when required. The interior of this inner cylinder is filled with " pieces of porous carbon or coke, which are covered with a coating " of platinum by the Knoltz and Eagleton," [Elkington?] " or by " any other proper process;" the outside of this vessel is covered with sheets or ribbons of platinum, which are connected together by a platinum wire, and which communicate with the coke by means of another platinum wire. The glass vessel is filled with oxygen. The space between the glass vessel and the porous cell is small, and is " filled with small granulated pieces of porous " coke" saturated with nitric acid. Weak sulphuric acid fills up the space between the porous cell and the zinc cylinder.

" The inner vessel being closed at the top, the nitric acid is " prevented from rising in it, but the fumes of such acid rise and " fill such vessel, and surround the platinized coke, and thus " render the whole interior a source of electricity, and make the " battery as powerful as if the inner vessel were wholly filled with " acid, but at a greatly reduced expense."

A stop cock (instead of a stopper) is described in the Complete Specification, and shown in the Drawings.

[Printed, 8*d*.]

A.D. 1860, January 10.—N° 67.

ALLDAY, WILLIAM THOMAS BISSELL.—" Certain improved " apparatus for separating filings or other small bits or particles " of iron or steel from other metallic filings, scrapings, chippings, " or other small particles or dust."

This invention " consists of taking the dust filings, chippings, " or other small particles in mass, and letting it fall over an in- " clined riddle or sieve, which will allow the grosser parts or " filings to roll off into one receiver, while the smaller particles " will fall through the sieve to a receiver below, from whence, by " a regulating and vibrating mouth, it is allowed to descend on a " wheel fitted with magnets placed in a radial direction." The dust, its weight being on one side of the wheel only, will cause the wheel to revolve and to appropriate to itself all the iron or steel filings, while the brass dust falls into a receiver below. A brush, suitably fixed to the receiving vessel, removes the iron or steel particles into a separate compartment.

" A vibrating regulating mouth-piece " at the bottom of the brass receiver enables the metallic dust to be still further purified from iron by obliging it to descend on " a regulated inclined " plane " " of reciprocating magnets " to a hopper below.

The hoppers may be vibrated and the brushes of the " recipro- " cating magnets " worked, either by means of the weight of the dust or by a separate motive power.

[Printed, 1*s*.]

A.D. 1860, January 12.—N° 84.

SINNOCK, WILLIAM.—(*Provisional Protection only.*) " Im- " provements in the arrangements of apparatus for the manufac- " ture of hempen or other fibrous covered insulated wires for " submarine telegraph cables."

It is proposed to effect the " obtaining and maintaining com- " plete uniformity of tention of the whole of the threads, " yarns, or cords in the form as well as the make " of a cable, " by arranging and setting up the first, or forming tube, and the " second or ' make ' tube (which should be a spiral tube) at a " distance of some ten to twenty feet apart, in which space the the

" assimulation and uniformity of tension may be secured previous
" to the yarns, threads, or cords entering the 'lay,' and then to set
" up the said second tube, whether it be an adjustable spiral
" spring tube, a lever nipper tube, or the ordinary permanent
" ropeing tube (either of which may be used," but the inventor
prefers " the adjustable spiral spring tube), so that whenever and
" immediately upon a stoppage taking place the compressional
" arrangement may be motioned slowly in a sliding grooved
" frame by suitable mechanical means backward from the point
" of 'lay' or 'make' of whatever form the cable may be, or if
" necessary entirely removed therefrom. By this means the points
" of tension imposed by the draw off and the heated surface of the
" tubular compression are continuously being changed by ts
" passing over the exterior surface of the cable."

[Printed, *4d.*]

A.D. 1860, January 12.—N° 85.

SINNOCK, WILLIAM. — (*Provisional Protection only.*) "An
" improved apparatus for paying-out submarine telegraph
" cables."

" A self-acting speed regulator (being a mechanical arrange-
" ment, as herein-after described,) " is " attached to the delivery
" drum of the cable on board the vessel, so that the speed of
" delivery will be determined and accelerated or diminished by
" and according to the motion of the hull, and made exactly
" equal to the speed thereof through all its undulatory move-
" ments, the cable being consequently payed out with one uni-
" form degree of tension thereon under all the varied impulses
" and circumstances. The mechanical mode of determining and
" regulating the speed of delivery is to gear or connect the cable
" delivery drum shaft with the engine driving shaft by a pair of
" inverse action expanding riggers, regulated for driving in either
" direction by a spur pinion, which is impelled by a wormed
" cross shaft, which is motioned by a pair of immersed water
" wheels so made and placed upon or under the hull of the
" vessel that alternating motion of the spur pinion is imparted
" thereto by and according to the rise and fall only of the hull of
" the vessel, thus constituting in its whole a complete self-acting
" speed regulator, especially adapted for paying-out submarine
" telegraph cables."

[Printed, *4d.*]

A.D. 1860, January 13.—N° 93.

GISBORNE, Frederic Newton.—(*Provisional Protection only.*) The title of this invention is "Improvements in insulating "material for telegraphic purposes."

The inventor states:—"My invention consists of an improved "compound for insulating telegraphic wires, and contains the "following ingredients, viz^t.:—3=three parts of bituminous pitch "or asphalte, 1=one part of coal silicate or earthy substance, "$1\frac{1}{2}$=one part and a half part of gutta percha or other plastic "gum, $\frac{1}{2}$=half a part of sulphur, 6=six parts in all. I do not "confine myself, however, to these exact proportions, but claim "the compound as based upon bituminous substances as my "invention. The compound thus prepared is applied as primary "or secondary insulation, or as a preservative against insects "or rot."

[Printed, 4*d.*]

A.D. 1860, January 14.—N° 109.

CHATTERTON, John, and SMITH, Willoughby.—"Improvements in treating gutta percha, India-rubber, and compounds of those substances."

"One object of this invention is to render the gutta percha, "india-rubber, and compounds containing either of those substances when employed for coating and insulating electric "telegraph conductors less permeable when subjected to great "pressure of water and more durable when exposed to air.

"Another object of the invention is to improve the pliability "and durability of tubes and other articles made of gutta percha, "india-rubber, or compounds containing either of such substances. And the invention consists in immersing and soaking "for some hours such coated or insulated electric telegraph conductors, tubes, and other articles in a heated insulating liquid "not being being a solvent of gutta percha or india-rubber, which "will fill the pores of such substances; although other insulating "liquids may be employed in carrying out" this invention, the inventors "prefer to use the best wood tar for these purposes."

Stockholm tar, at 80° or 90° Fahrenheit, is stated in the Complete Specification to be the insulating liquid preferred for the above-mentioned purposes.

When the coated wire is for a submarine cable it is subjected to

the above-described process "immediately before it is covered "with tarred yarn."

To make the mixture harder when cold, a certain proportion of resin is added to the tar.

[Printed, 4*d*.]

A.D. 1860, January 17.—N° 122.

JOHNSON, JOHN HENRY (*a communication from John M. Batchelder*). — "Improvements in the insulation of submarine "electric telegraph wires."

"According to this invention it is proposed to cover the con-"ducting wire in any convenient or well-known manner, with a "compound consisting of pulverized silex, glass, or other abso-"lute non-conductor of electricity, mixed with india-rubber and "sulphur, and subsequently vulcanized. Or in some cases pure "india-rubber, without sulphur and vulcanizing, may be used, "mixed with pulverized silex, glass or other non-conductor in "suitable proportions."

"The improved insulating material or compound is prepared "by first thoroughly grinding or masticating the india-rubber "and sulphur, thus forming a paste or dough according to the "ordinary process of making vulcanized india-rubber and then "adding thereto a quantity of silex reduced to a fine powder "The ingredients should be thoroughly incorporated and uni-"formly mixed."

The above-described "new compound substance" offers "the "advantages of greater flexibility and elasticity, and less liability "to be softened by heat, whilst at the same time a better insula-"tion is obtained, as the compound employed is a more perfect "non-conductor of electricity."

[Printed, 4*d*.]

A.D. 1860, January 26.—N° 196.

BEARDMORE, SEPTIMUS. — "Improvements in electric tele-"graphs."

This invention consists of improvements on the methods of working electric telegraphs by means of voltaic couples "in "electrolytic connection with the earth," as set forth in N°s 9745 and 12,959 of the Old Law, and N° 2580 (A.D. 1858).

In these improvements positive and negative elements are placed

in electrolytic connection with the earth at each station; the receiving instruments are in connection with the negative elements, and the keys or transmitting instruments with the positive elements, at each station. The signals are made by bringing the positive elements into the telegraphic circuit at the transmitting station.

In this invention the size of the plates of the positive and negative elements is arranged "in accordance with the section of "the line wire connecting them, and without reference to the dis-"tance they may be separated from each other." This is accomplished by increasing the sectional area of the conductor "as it "increases in length, in the usual manner, as is well understood "among telegraphists."

In one instance the positive elements consist of plates of an alloy of zinc and sodium placed in porous vessels imbedded in the earth and partly filled with mercury and with dilute acid. In another instance sodium is placed in a porous vessel at the bottom of which is a little mercury, it (the sodium) is then covered with mineral naphtha; the porous vessel is placed in another porous jar containing dilute acid and "in electrolytic connection with the "earth." "The amalgams of ammonium and sodium will also "afford great electro-motive force, and may be used."

The negative elements consist of plates of platinum, platinized graphite, or lead, placed in porous cells filled with a mixture of dilute sulphuric acid and bichromate of potash or other highly oxygenated solution; the porous cells are embedded in the earth.

A good electrolytic connection of the elements with the earth is kept up by means of a supply of solution to the porous vessels from glass or other vessels containing the said solutions; the supply is "regulated by the condition of the ground for absorbing "the liquid."

[Printed, 8*d*.]

A.D. 1860, January 26.—N° 204.

NEWTON, William Edward (*a communication from Alfred Joseph Watts*).—(*Provisional Protection only.*) "The manufacture "of gold in a new form, and its use in such form for filling or "plugging teeth."

This new form of gold is called "crystal gold" and is obtained by electrolyzing a peculiar solution of gold with gold poles, re-

gulating the current by means of a rheostat and galvanometer until the desired condition of the metal is obtained. The current may be regulated either by beginning with a weak electric power and increasing it until the gold deposit assumes the "bright "glitter" which is characteristic of this kind of electro-deposit, or by beginning with the full power of the battery and decreasing it until the above-mentioned result is obtained.

The above-mentioned electrolytic solution consists of a mixture of chloride of ammonium and perchloride of gold. "There are "many other solutions from which exactly the same material "may be made, as the double chloride of gold and sodium, the "treble chloride of gold and sodium and ammonia, and the "treble chloride of gold and potassium and ammonia."

"The bright leaves or leaf-like crystals thus obtained form after "proper burning a soft, plastic, tough, and tenacious mass of "gold, which may be more readily, easily, and perfectly con-"solidated by pressure than any other form of gold hitherto "known."

[Printed, 4*d*.]

A.D. 1860, January 27.—N° 206.

VARLEY, Cromwell Fleetwood. — "Improvements in "electric telegraphs, part of the invention being applicable to "other purposes."

1st. "Improvements in the construction and testing of the "cable." Two or more conductors in a cable are joined together at frequent intervals, "these conductors being otherwise electrically "insulated from each other." When the insulating covering of such a cable is damaged, water enters, and the wire becomes defective; positive electric currents, intermitted by negative currents of short duration, are applied to the cable "to eat away that "portion of the conductor till its exposed ends retire so far within "the insulating envelope as to offer resistance enough to make "the line workable again." The remaining insulated wire or wires will carry the current over the damaged portion of the cable.

2nd. Improvements "in the mode of insulating those portions "of the circuit that are suspended in the air, and in insulating "the line from extraneous currents." Metal insulators, covered partially or wholly with vulcanized caoutchouc by the process set forth in N° 227 (A.D. 1860), are used to insulate suspended line

wires; these may be coated with a mixture of resin, shellac, Venice turpentine and powdered silica, to give them a smooth and highly non-conducting surface. The line is insulated from the discharge of electricity from the atmosphere into the earth, or from the lower to the upper strata of the earth "by making connection "with the earth several miles out to sea." The cable is preserved from lightning by using the vacuum lightning conductors invented by the Patentee "in 1847;" the conductors are connected to the vacuum, and the earth connection is made "by soldering to the "iron wires of the shore end of the cable."

3rd. Improvements "in the mode of producing the electric "impulses which are to produce the signal at the distant end." Induction plates, similar to those described in No 2555 (A.D. 1854), are used; they are charged by a machine described in the last portion of this invention and discharged "into the cable to pro-"duce the required signals," or they may be charged "by means "of batteries connected to them through resistance coils," so that a powerful discharge is obtained at the first moment of contact "rapidly decreasing in tension and of measured amount, "measured by the capacity of the induction plates." Instead of induction plates, induction cells may be used, these consist of cells connected together by platinum plates as a voltaic battery with similar plates instead of with positive and negative plates; each cell contains weak sulphuric acid and two platinum plates; a sufficient number of cells to prevent electrolysis of the acidulated water should be used; these cells are used "in conjunction with "the battery" so that "the force of the charge in the plates" is "added to that of the battery."

When using the induction cells for electro-blasting or similar purposes, alternate plates are connected by means of "a compound "switch," with one pole of a galvanic battery, the intermediate plates being connected with the other battery pole; the plates are thus charged for quantity. "When the plates are charged the "switch or commutator is reversed," and the plates are "dis-"charged into the wire leading to the fuse."

4th. Modes "of producing the signals at the far end at a rapid "rate."

The above-described induction cells may be used in connection with local circuits "to elongate the marks, and thus make an "almost momentary contact of the relay, give an intelligible "signal."

"At the receiving end of long submarine or other lines," relays are used "which record the impulses, whether the electric wave "pass the zero or not." Instead of using a fixed stop in the galvanometer relay described in N° 371 (A.D. 1854) "for the "contact piece to strike against," the inventor mounts "a fork, "between whose limbs the contact piece vibrates on an axle having "a due amount of friction;" the prongs of the fork are insulated from each other; instead of the galvanometer relay, the relay described in N° 3059 (A.D. 1856) may be used, the "centre piece" "being magnetized with the same pole as the electro-magnets." Another relay, "suitable for very feeble currents coming through "very long lines," "records the rise or fall of the electric wave" "without any mechanical break of contact of the relay connec-"tion;" the needle is mounted horizontally "& carries a "platinum wire dipping into a vessel (say glass) containing a "suitable solution, say, sulphuric acid & water, this vessel is "divided into two or more compartments, all connected together, "& over which the platinum wire passes, each of these com-"partments have connections so that the current passes chiefly "into that one over which the platinum wire is situated for the "time being;" this relay may either be connected with the relays of a Morse instrument carrying several points, or with a relay wound with two wires in opposite directions, the above-mentioned sensitive relay having (in that case) only two compartments.

5th. "A mode of producing electricity for the above purposes." An insulated electric conductor is placed between two charged conductors, connected to earth, placed between two other conductors, connected to earth, taken back to the first pair of conductors, and so on, until, by electro-static induction, "the charge "rapidly augments to the required amount." A machine is described and shown for producing statical electricity by the above-mentioned means; the insulated plates are mounted on vulcanite discs, and, by rotation, are carried between the charged plates and opposite to earth contacts; the rotation of the machine therefore augments the charge to the required amount.

When the electro-static machine is used "as an electrometer," spring connections are put to the fixed charged plates and to the earth connections; small Leyden jars are attached to the plates "until the ratio of augmentation corresponds to the logarithmic "number." To use this machine it is charged with the amount of electricity to be measured, and connected to two portions of a

light sphere which are kept apart by a spring equal to a resistance that can be overcome by a known electric force; the machine is then rotated, and the number of revolutions requisite to overcome the spring is noted, the ratio of augmentation being known, the amount originally imparted to the machine is easily calculated.

Where great tension is required the apparatus is placed in an air-tight vessel, and air is compressed into the said vessel.

The electric force produced by the electro-static machine may be used "for testing the cable to ascertain that the conductor is "nowhere too near the surface of the insulator." Statical electricity is proposed to be used for this purpose in N° 1318 (A.D. 1855).

[Printed, 1s.]

A.D. 1860, January 28.—N° 217.

WILKES, John, WILKES, Thomas, and WILKES, Gilbert.—(*Provisional Protection only.*) The title of this invention is "A "new or improved method of manufacturing wire for electric "telegraphs, and for such other uses as the same is or may be "applicable to."

The inventors state:—"Our invention consists of the method "herein-after explained of manufacturing wire from copper or "other suitable metal or alloy for electric telegraphs and for other "purposes. Wire made according to our invention is stronger than "ordinary wire and less liable to injuries which affect its conduct-"ing power. We carry our invention into effect in the following "manner:—We take a hollow cylinder or tube of copper or other "metal or alloy of which the wire is to be made, and we fill the "said tube with three, four, or more wires of the same metal or "alloy. We then roll or draw down the said tube and wires until "the mass has acquired the requisite diameter; the wires with "which we fill the tube may either be cylindrical in figure or be "wedge-shaped so as the better to fill up the tube. The figure "of the wires is, however, of little importance, as in the rolling "or drawing process the said wires and the tube become consoli-"dated into a compact mass. Wire made according to our inven-"tion is not so liable to loss of conducting power when used for "electric telegraphs as ordinary wire, for a defect in or injury to "one of the wires does not extend across the compound wire, "and little loss of conducting power results from such defect or

" injury. In ordinary wire a defect or injury may extend across " the wire and result in a total loss of conducting power."

[Printed, 4d.]

A.D. 1860, January 30.—N° 234.

HOLMES, NATHANIEL JOHN, and CORDON, JAMES.—(*Provisional Protection only.*) The title of this invention is "An im- " proved method of purifying fluids or substances by electro- " magnetism."

The inventors state:—"This invention has for its object an " improved method of separating iron or other magnetic sub- " stances from liquids or other materials by the power of " electro-magnetism, and especially in its application to the puri- " fication of slip and other potter's materials. The nature of this " improved method will be understood to be as follows:—The " slip liquid flint clays or other materials, when in a proper fluid " state, are passed through a narrow trough or closed box, into " the interior of which a series of electro-magnet poles are placed, " whereby the slip, in its passage through the box or trough, is " brought successively into contact with each of these electro- " magnetic poles, and the particles of iron, nickel, or other mag- " netic substances incorporated in the mass, are withdrawn by " adherence to the electro-magnets. The number of these electro- " magnets are proportioned to the nature of the substance or fluid " operated upon. Upon the electric current being withdrawn " from the electro-magnets, the particles in adherence are released " and fall away, the machine being thus readily cleansed for " future operations. Having now described the nature of our " said improvement, what we especially wish to claim is, the " application of electro-magnetism to the purification of slip & " other potter's materials from iron and other magnetic impu- " rities they may contain."

[Printed, 4d.]

A.D. 1860, February 1.—N° 261.

STODDART, ALEXANDER (*a communication from John S. Davison*).—"Improvements in submarine telegraphic cables."

"According to this invention, the conductor is made capable of " greater extension than the exterior of the cable. This is effected

" by forming it of a bundle of straight wires, each wire being of " a comparatively short length; they are bound together by a " wire lapped spirally around the bundle, and each of the short " wires in the bundle is attached at one end to one of the convo- " lutions of the binding wire. When a strain comes on a con- " ductor constructed as above described, it causes it to elongate, " the coils of the spiral binding wire becoming more open, and " the interior wires slide the one on the other, being all of them " attached to the spiral. In this manner the continuity of the " conductor is ensured, however much it may be extended while " laying."

The helically-laid wire "may be of brass or any other suitable " metal, as the coil need not be used as part of the conductor."

"The wires are shown in the Drawing enclosed in an insulating " tube," "and this tube may be covered with hemp, or other- " wise, to keep the capble from stretching whilst being laid."

[Printed, 6*d*.]

A.D. 1860, February 6.—N° 313.

NEWTON, ALFRED VINCENT (*a communication from James Bell Alexander*).—(*Provisional Protection only*.) "An improve- " ment in laying submarine electric telegraph cables."

"Floats are attached to the cable at certain distances as it " leaves the vessel, the same being so constructed as to support " it near the surface for as long a time as may be deter- " mined upon after it reaches the water, and to allow it after the " expiration of such time to sink gradually to the bottom. The " kind of float which is proposed to be used for this purpose is a box " of tin plate or other metal made water-tight, with the exception " of a small orifice in its bottom for the ingress of water, and a " similar orifice in the top for the egress of air, so that the box, " after floating for some time, may be sunk by water entering the " lower orifice. These floats may be attached to the cable at " distances of from one hundred to two hundred yards or more " or less apart by means of a stout cord about four fathoms or " more in length, which will allow of the cable, while the floats " remain on the surface of the water, being suspended below them " at such depth as not to be liable to injury from vessels passing " over it. The cords may be attached to the cable by nippers by " tying or other means of fastening it; but the simplest and

" quickest mode of attaching them will, perhaps, be by providing " a loop at the free extremity of each cord large enough for the " float to be passed through it, passing the cord round the cable, " and passing the float through the loop, and then drawing the " cord tight upon the cable."

[Printed, 4*d.*]

A.D. 1860, February 7.—N° 324.

BREITTMAYER, Aimé Louis Eugène.—" Improvements in " machinery for and in engraving the metallic surfaces of printing " rollers or cylinders."

This invention relates to the process described in N° 2414 (A.D. 1857), for engraving printing rollers from a varnished pattern by means of electro-magnetism.

1st. Arranging machinery similar to that above mentioned, " in such manner that two or more tools may be worked at the " same time from one pattern cylinder." " For this purpose each " tool is actuated by a separate electro-magnet," and the galvanic circuit (when it is completed by the tracing point) proceeds simultaneously through the coils of all the electro-magnets.

2nd. Arranging machinery similar to that above mentioned " in such manner that from two or more pattern cylinders, each " having a different design upon it, two or more cylinders may " be engraved, and the design engraved on each printing " cylinder be repeated two or more times along its length." A separate cutting tool, actuated by a separate electro-magnet, " is " employed for every repetition of each design." The coils of the electro-magnets are all connected to the same battery, but each pattern cylinder and printing cylinder has its own circuit.

Each cylinder is first coated with varnish, the varnish is removed by the above-described process, and the cylinder is electro-etched.

The Drawings show a machine with two pattern and two printing cylinders; each printing cylinder has seventeen cutting tools.

[Printed, 10*d.*]

A.D. 1860, February 8.—N° 335.

JOHNSON, John Henry (*a communication from Jean Joseph Etienne Lenoir*).—" Improvements in obtaining motive power, " and in the machinery or apparatus employed therein."

"The said invention consists in the application and use of an "inflammable gas mixed with a proper proportion of atmospheric "air and ignited inside a cylinder by the aid of electricity, the "expansion thereby produced acting upon the piston and im-"parting motion thereto, which motion may be transmitted in "any convenient and well-known manner to a driving shaft." Either a disc valve or two slide valves on opposite sides of the cylinder is or are used, the slides "are held against the valve "faces of the cylinder by springs or screws. Suitable means "are employed for admitting atmospheric air into the cylinder. "Along with this air there is also admitted, by means of a pipe "employed for that purpose, a supply of ordinary lighting or "other inflammable gas or vapour. Inside the cylinder are fitted "either at the middle or at both ends thereof one or more "pairs of insulated platinum or other wires in connection with a "battery, and so disposed that an electric spark will be produced, "which will instantly ignite the mixture of air and gas contained "in the cylinder on one side of the piston, and by the expansion "of the air so produced force the piston to the opposite end of "of the cylinder. The supply of gas is regulated by a suitable "stop-cock and governor."

The vapour from heated solid or liquid hydro-carbons "may "be employed in this engine for heating and expanding the air "and its combinations."

A "director" is used to complete the electric circuit at the proper times. This instrument consists of a wheel commutator on the fly-wheel shaft, the metallic segments of which are suitably connected with a Ruhmkorff's coil, and with the above-mentioned platinum wires.

[Printed, 10*d.*]

A.D. 1860, February 15.—N° 417.

BONELLI, GAETANO.—"Improvements in machinery for weaving "figured fabrics."

In this invention a single plate in combination with electro-magnets and their keepers, is substituted for the cards used in the jacquard loom. "This plate has openings or perforations made "in it corresponding in number to the horizontal needles of the "jacquard apparatus. These openings or perforations are stopped "or closed when required by means of small iron rods, which are

" drawn forward at suitable times by means of electro-magnets, " but when these small rods are not drawn by the electro-magnets " the openings or perforations in the plate will be left open. The " insulated wires of the coils of the electro-magnets are connected " respectively to one of a series of thin metallic plates which come " in contact with the pattern, the said pattern being for that pur- " pose painted or drawn upon a flexible metallic sheet with an " insulating varnish, or the design may be composed of a sheet " metal pattern fixed upon an insulating layer or surface."

A circuit breaker is brought into action at suitable times by means of the traversing frame that carries the armatures of the electro-magnets, and the jacquard plate; this circuit breaker completes the electric circuit after the thin metallic plates have come into contact with the pattern, and breaks the circuit before the said plates are lifted off from the pattern for the re-adjustment of the armatures, therefore no electric sparks occur at the pattern.

Neighbouring electro-magnets are of different polarities, and have their coils wound in opposite directions.

In patterns of various colours the warp threads of one colour only are operated upon at the same time.

The pattern may be metallized by electro-deposition.

[Printed, 8*d.*]

A.D. 1860, February 17.—N° 438.

JOHNSON, JOHN HENRY (*a communication from Auguste Prouvost*).—" Improvements in machinery or apparatus for twisting, " doubling, and winding thread."

1st. " A machine for making cops." " The threads are un- " wound from pirns at the back of the machine, and pass through " guide eyes." " From these guide eyes they pass over a piece " of cloth which stretches them slightly, and thence they pass " under a glass rod and through guide eyes on the ends of oscil- " lating levers, which remain elevated so long as the threads are " unbroken, but immediately a breakage occurs they descend and " establish an electric circuit, the current through which effects, " by an electro-magnet and suitable mechanism, the stoppage of " the machine, and sounds an alarm at the same time." Then the threads pass through other guide eyes on the surface of a bar which lays the thread on the spindles and shapes the cop; several methods of working the said bar are described and shown.

2nd. "A machine for twisting and for winding off the thread "into skeins."

3rd. "A machine which accomplishes the threefold operation "of twisting the individual threads, uniting the same, and twisting "them together."

"It is further proposed to make the spools or pirns with metal "cores obtained by the electrotype process, whereby they may be "readily and without injury transferred to the mule spindles, "which twists the thread at the same time that it is unwound, "thereby effecting a saving of time;" "the thread can be wound "off to the bottom without any waste."

[Printed, 10d.]

A.D. 1860, February 17.—N° 442.

IRONS, David.—"Improvements in ships' compasses."

The objects of this invention are to make ships' compasses act with certainty and to prevent local attraction.

The novelty in this invention "is forming ships' compasses "with four or more satellites, all moving on the same central "stone, yet each having separate pivots."

In compasses "for the true meridian," in addition to "the "satellites," the compass card has transverse magnets radiating from the centre, besides the principal needle; at the exterior of the card the north pole of one of the transverse magnets points to the west and the south pole of the other transverse magnet to the east. In one instance "the satellites" are mounted in exactly a similar manner to the principal compass card, and the poles of their magnets point in the same direction, in another instance "the satellites" are crescents and have small cross magnets on each.

"The magnetic bearing compasses" similar in principle to the above, have similar "satellites," but there are no transverse or cross magnets.

In compasses "for great circle sailing," "the satellites" are also used in connection with a principal card that carries a number of magnets. In one case the inner poles of the transverse radiating magnets are nearly or quite in contact with the principal magnet; in another case intermediate radiating magnets to the transverse magnets are used; magnets are placed round the circumference

of this last card, in a modification of the arrangement. Lastly, in addition to the transverse magnets, curved magnets are used.

[Printed, 1s.]

A.D. 1860, February 20.—N° 465.

BRIGHT, SIR CHARLES TILSTON.—" Improvements in working " and testing telegraphic conductors, and in apparatus connected " therewith."

1st. Recording signals or signalling by sound, " through the " agency of a local circuit."

In the relay described and shown, two pivoted permanent magnets are kept against contact screws by springs, except when their electro-magnets are excited; in the latter case a positive telegraphic current deflects one permanent magnet only, and a negative telegraphic current deflects the other permanent magnet only; when deflected, the permanent magnet leaves one contact screw and makes contact with another. In one instrument one pole of the permanent magnet vibrates between the poles of the electro-magnets, and in the other the permanent magnet faces the electro-magnets, as in the receiving and other instruments described in N° 14,331 (Old Law). " This arrangement of coils " magnets, and contacts is applicable to that system of signalling " set forth in N° 54 (A.D. 1858).

The sending key used with the above-described relay has springs and stop contacts, and consists of two finger keys close together, " each sending currents of opposite character to the other, and " each when used having the effect (in addition to sending its " current) of placing on short circuit, or of disconnecting alto- " gether, the coil or coils through and by means of which signals " are received at the home station. When the key returns to its " position of rest, the receiving coils are again placed in circuit " with the line wire, so as to be ready to receive currents from the " distant station."

2nd. "The employment of mechanical force for the production " of telegraphic signals, such force being brought into action or " regulated by the electrical currents transmitted through the " line." A train of clockwork may be used to carry this part of the invention into effect. The following are the apparatus described (more or less) in the Specification :—

A lever (which may make contacts, give signals, or print characters) has a spur pinion mounted on one end which is free to move on its axis, by the agency of clockwork, until the depression of a brake armature by an electro-magnet prevents its free rotation and transfers its motion to the lever; by this means the lever is deflected in opposition to the action of a spring, the clockwork being brought into action and regulated by the current that excites the electro-magnet.

The above-mentioned lever may be connected to an ordinary governor, a brake apparatus similar to the above producing variations of rate in the revolution of the said governor.

The above-mentioned train of wheels may rotate a vessel containing mercury and thereby produce different heights of mercury in tubes attached thereto, according to the speed of rotation.

"Variations in the rate of mechanism may also be adapted to "the production of signals to the eye or ear by different periods "of the succession of marks or sounds."

Contacts may be made "by the use of two wheels facing each "other and driven by mechanism at slightly different rates."

Two surfaces may be employed to carry out the objects of this portion of the invention, "one of which is driven by the motive "agent," while the other is restrained until the action of the electric current.

By this part of the invention signals or currents may be retransmitted, forwarded, or reversed; the "return current" may, by this means, be discharged "between the separate signals."

"An isochronous regulation" of the mechanism may take place, "so that numbers, letters, or other indications may be "read off according to the duration of the current."

In "an apparatus for retransmitting signals through one circuit "by the agency of clockwork controlled by electrical currents "received through another circuit," the motion of the escape wheel of a train of clockwork is controlled by the pallet armature of the receiving electro-magnet. On the escape-wheel axis is a wheel carrying a contact pin; the said contact pin (by removing springs from fixed contact screws) makes, breaks, or reverses the current as required. A system of signalling by reverse currents as set forth in N° 54 (A.D. 1858) may be worked by this apparatus.

In "an arrangement whereby the force of the currents brought

" into play, as well as their duration (if required), and that of a " direct connection to earth between the currents (where it is " desirable to adopt such a system), may be regulated according " to the requirements of the circuit to be worked," two trains of clockwork are controlled by the same electro-magnet; one train transmits the currents onwards and makes the earth contacts, the other train places the receiving instrument on short circuit and regulates the force and duration of the currents. This arrangement is preferred "for use in signalling by reverse currents, one " for each separate signal."

In this part and the 4th part of the invention, "where great " exactitude of motion is desirable," a conical pendulum is used; the said pendulum is driven by the clockwork train and governed by electric currents sent periodically. Electro-magnets, placed radially, act upon a magnetized needle on the axis of the pendulum, and thus control the speed of the said axis. "A fly wheel with " adjusting vanes and weights" may be used instead of the pendulum.

3rd. For sending currents, "a key combined with a switch" is employed, "by which the conductor may be cleared of the residual " effects of a former current, and the circuit changed for receiving " at one operation."

4th. "The transmission of signals through such lines as from " their length or other causes require great care to be exercised in " the duration and nature of each current sent to produce a given " effect, or in the period of discharge between the separate signal." This part of the invention is especially adapted to the system of signalling set forth in N° 54 (A.D. 1858).

"A key board fitted with a key for each separate sign" is used. A train of wheels, controlled by the conical pendulum before described, "is so arranged that by pressure upon any key, a cor- " responding wheel or disc is geared into or coupled to the " machinery when in motion;" the various forces or durations of currents and the reversals of currents are brought into successive action, and varied periods of connection of line with earth between the currents, are made by cams or studs "upon each such wheel." " Upon the completion of the signal, the end of a lever, which is " raised by the action of the key, falls into a slot in the periphery " of the disc or wheel, which is then ready for the transmission of " another signal when required." Sometimes three keys are pro-

vided for each sign, one for small residual effects, the second for large residual effects, and the third for still larger residual effects. "This apparatus may be adapted for use as a retransmitting in- "strument after the system described in the second part of this "Specification."

5th. Step-by-step indicating or printing telegraphs are arranged to send return currents "back to the sending instrument," upon which "another current passes to the receiving instrument, and so "on until the desired letter has been reached."

The rotation of the indicator winds up a light spring, which, being released "by a current differing in character from those used "to advance the indicator," brings back the said indicator to zero.

The indicator is moved by a local circuit brought into action by a relay, both in sending and receiving.

6th. Relays are employed "capable of being moved in one direc- "tion by a positive current, and in the opposite by a negative "current, being retained in a central position when no current is "passing by the attraction of a pole or poles of an electro-magnet, "the influence of which upon the moving part of the relay is "neutralized during the passage of a current of either kind "through the coils of the relay."

7th. "Testing out the position of defects in telegraphic con- "ductors." "Each end of the defective conductor is tested by "being connected to a galvanometer, the other side of which is "joined to one pole of a battery, the other pole of which is in "connection with the earth. To the first-named pole of the "battery is also connected another galvanometer exactly similar "to the first, to the other side of which is connected sufficient "artificial resistance" in the manner set forth in N° 14,331 (Old Law) "until the result indicated by the two galvanometers is the "same." "The relative proportions of the resistance found "necessary to produce the above result at each end are then com- "pared with the total length of the conductor tested." Resistance tubes of distilled water are used. In some cases the different amounts of deflection shown by a sensitive galvanometer (con- nected to the line and earth) "when applied to each end "of the conductor" are equalized by the introduction of known resistances, "the position of the fault may then be cal- "culated."

[Printed, 1s.]

A.D. 1860, February 23.—N° 485.

DUJARDIN, Pierre Antoine Joseph.—" Improvements in " printing telegraphs."

The principal features in this invention are the letter wheel in the receiving apparatus and the mode of impelling and working the same. The letter wheel consists of "a dial of aluminium," " on which the alphabetic characters and other signs are em- " broidered circularly with a thread of cotton or other substance, " and constantly moistened with oily or other ink." The hammer for impressing the letters on the paper, consists of "a conical " pipe or instand," [inkstand ?], fixed on the lever armature of the local electro-magnet, "closed at its lower part with a piece " of flannel and filled with cotton. The flannel and the cotton " are imbued with oily ink." The letter wheel is impelled by means of alternate currents in the-line wire circuit.

The "manipulator," described in the Specification and shown in the Drawings, "is founded on the principle of that of the French " railway telegraph." The oscillating lever that works in the wave-line wheel (in combination with two fixed metallic pieces) acts as a commutator to send alternate currents until the handle is brought to rest at the letter to be transmitted; the depression of the handle puts into action another commutator, which breaks the line circuit.

The receiving instrument is also a modification of the French railway telegraph. Whilst the manipulator handle is being rotated, the alternate currents rotate the letter dial, but when the said handle is depressed the local circuit has time to act upon the hammer and to print the letter. One clockwork, regulated by the line-wire electro-magnet, is used to impel the letter wheel, and a stronger clockwork, started by the re-action spring of the local electro-magnet, moves the paper band for the printing of the next letter.

[Printed, 10*d*.]

A.D. 1860, February 23.—N° 486.

MAPPLE, Daniel Moore.—(*Provisional Protection only.*) " Im- " provements in electric clocks and electric batteries."

" The improvements in electric clocks relate to the manner of " working the impulse weight by which the impulse is given

"at proper intervals to the pendulam of the clock. The impulse "weight lifted by the action of an electro-magnet is brought "to a position in which it is retained by the operation of a per- "manent magnet; an electro-magnet is caused to release the "weight from the action of the permanent magnet, and to allow "it to impinge upon the pendulam with a constant and regulated "impulse.

"The improvements in electric batteries consist in forming one "pole of the battery of a pot of blacklead, graphite, or plumbago, "or of two or more of these substances mixed, and so as to con- "tain the acid, being in this respect a cell. When great power is "required the pots may be coated inside with platina, or any "other metal which may be deposited by the electro-plating "process."

[Printed, 4*d*.]

A.D. 1860, February 25.—N° 519.

SIEMENS, Charles William.—"Improvements in the con- "struction of electric telegraphic cables and conductors, and in "machinery connected therewith."

A submarine electric cable, manufactured according to this invention, consists of a strand of seven copper wires "impregnated" with bituminous or resinous cement and formed into a cylindrical body by "passing it through a heated die so as to compress the "wires together." The conductor is then passed through a "straightening" machine, and is enclosed in several tubular coverings of "Wray's mixture" by means of machinery. Layers of cemented yarns are then applied in a state of uniform tension and with a slight twist, by means of another machine, "the twist "being in alternate directions in the successive layers." The whole is "covered with a continuous tubular metallic casing, or with a "thin wire or wires serving the same purpose, and bedded in "cement, and tightly grasping the core throughout its length."

In the "straightening" machine the conductor is passed between a series of grooved rollers "so placed as to bend the wire "just to the limit of elasticity, and thus to take out the bends "which may have previously existed in it."

The machine for covering wires with a tubular casing of the mixture of India-rubber and other materials described in N° 2270 (A.D. 1858), and known as "Wray's mixture," is similar in gene-

ral construction to one described in N° 2503 (A.D. 1859). Two hard steel grooved rollers are made to revolve in contact with each other, by means of screw wheel and spur wheel gearing, "and form "a circular aperture at their junction." "Two angular knives" "are fitted to the sides of the rollers, and pressed against them "by a strong bent spring with adjusting screws." "The wire "to be covered" is placed in the circular aperture between two strips of "Wray's mixture." The excess of width of the strips is compressed by the edges of the rollers and made to unite and form a perfect tube, while the surplus is cut off by the knives.

Another machine is described and shown, which produces tubes of the above-mentioned or any similar material, independent of any conducting wire inside, or surrounding a helical wire core.

The chief novelty of the machine, by which the layers of cemented yarns are placed on the insulated conducting wire, is that the cement is softened (just before the yarns or cords reach the core) by means of a conical steam jacket. A uniform strain is maintained on the yarns by means of wooden brake blocks, "which enter between or rub against the bevilled edges of ad- "joining reels, and press against them, or against which the reels "are pressed" by springs on the studs which carry the reels.

The "continuous tubular metallic casing" is applied by winding "a flat ribbon of copper" "in a helical direction round the "cable in such manner that the edge of each convolution over- "laps that of the preceding convolution. These overlapping "edges are tinned or soldered before winding on the ribbon, and "the whole is passed through a heated die, by which the solder "is suddenly melted and united."

The bedding in cement is accomplished by passing the cable through a hot die, the cement being supplied through lateral apertures in the said die.

A machine for welding the iron or steel wires employed in sheathing telegraphic cables consists of two hammers mounted on levers, so that the motion of a handle separates the hammers and brings them together again. The hammer frame is carried by trunnions, which admits of the blows being given "in a great "variety of directions on the junction; no anvil is required, as "the two hammers strike simultaneously in opposite directions." The wires to be welded are brought through the two trunnions of the hammer frame, and are secured in two rests by screws. The

heat is applied to the junction of the wires while they are in position, by means of a gas blow pipe fixed to the frame.

[Printed, 1s. 10d.]

A.D. 1860, February 25.—N° 526.

LANG, JOHN, and CHEVALIER, CHARLES.—"Improvements "in targets."

1st. "The construction of targets composed of several pieces "(irrespective of their shape and configuration), and connecting "each part or piece by means of electric, electro-magnetic, or "galvanic apparatus by means of two or more wires, with one or "more needles or pointers, and by which the part of the target "hit can be indicated or recorded at or near to the point from "which the projectile is discharged, or wherever else it may be "desired to convey such indication." The target is not fixed immoveably to the framing, as is ordinarily the case, but is connected thereto by means of levers and springs, so that the impact of a ball upon any one of the pieces composing the target completes an electric circuit. The normal position of the pieces or plates of this target is described and shown as being flush with each other. The indicating apparatus may have a needle and separate conducting wire to each portion of the target; but the number of needles and conducting wires may be reduced by using "the changes and permutations which can be made" with a given number of needles and positive and negative currents, to indicate separate portions of the target struck.

2nd. Using an electric circuit in connection with the above-mentioned target, and with electro-magnetic apparatus "either "alone or in combination with a stop-watch," for measuring the time of flight and the force of the blow of the projectile. The time may be measured by the "traversing of a pencil over ruled "paper moved by clockwork," and the force may be ascertained by means of the electric circuits respectively completed by edged or other suitable projections from the back of each piece of the target.

[Printed, 8d.]

A.D. 1860, March 3.—N° 590.

BAUER, WILLIAM.—"Improvements in apparatus for diving, "and for raising and lowering bodies in water, parts of which

"improvements are also applicable to other useful purposes." Among the "useful purposes" set forth are the raising, lowering, examining, and repairing of telegraph cables, and the use of "diving chambers as floating and immersable telegraph stations." In ordinary cases the diving chamber is in communication with the attendant ship, "by means of an electric or other telegraph." An ellipsoidal diving chamber, with a tower, may be used as "a "light ship," "a small balloon carrying an electric light" being used "when the sea goes high, and during the consequent immer-"sion of the structure."

The improved diving apparatus consists of a strong cylindrical chamber, made of metal plates, and completely enclosed, excepting an opening at the top for the admission of divers, which is subsequently hermetically sealed, the internal space being filled with air at the ordinary pressure.

When this system of diving apparatus is used to examine or repair telegraph cables, the diving chamber (by means of paddle wheels and rudder worked from within) is brought "exactly over "the spot where the cable to be operated upon is lying," and the jaws of a pair of "forks or tongs" (one on each side of the diving chamber) are made to close upon the cable. The diver then, by turning another handle, raises the cable and places it in a trough underneath the diving chamber, which is made with a removeable bottom; when the bottom has been replaced by means of suitable gearing, the lid of the trough is removed and the cable repaired. An inverse operation replaces the cable.

Other diving apparatus are described and shown.

[Printed, 2s.]

A.D. 1860, March 10.—N° 653.

MORRIS, TIMOTHY.—"Improvements in voltaic batteries, and "in vats used in depositing metals by electricity."

This invention consists in "connecting cisterns or reservoirs "with the cells of the said batteries, or with the said vats, the "said cisterns or reservoirs being filled with the liquids or salts "or solutions employed in the said cells or vats, so as to remove "the liquids or solutions from the cells or vats as they be-"come unfit for use, and replacing them by fresh liquids or "solutions."

When the density of the solution in the cell increases during

use, a closed reservoir containing liquid of a proper working strength is placed lower than the cell; a syphon from the top of the reservoir communicates with the top of the liquid in the cell, and a pipe from the bottom of the cell communicates with the bottom of the reservoir. The liquid in the cell, as it becomes heavier, descends into the reservoir, and an equal volume of fresh liquid passes from the reservoir to the cell. As long as the cell is in use, "and any unsaturated liquid remains in the reservoir," this action continues.

When the density of the solution decreases during use, the closed reservoir is placed above the cell, and its top and bottom are connected with the top of the solution in the cell by a syphon and a pipe respectively; the circulation set up by this arrangement keeps the solution in the cell nearly at the same density, as long as the density of the solution in the cell "differs from that " in the reservoir."

A double-fluid battery may be worked according to this invention by using the first arrangement for the zinc cell, and the second for the cell containing the negative plate.

[Printed, 8*d*.]

A.D. 1860, March 10.—N° 656.

JULLIENNE, MARIE JOSÉPHINE ELISABETH.—An invention for "an improved bath belt to be applied in the bathing vessels, " and in electrical apparatus connected therewith."

This invention relates to the "Hélène Jullienne" belt, "which " possesses the advantages of supporting in a bath in the most " agreeable manner and without the least fatigue either children " of all ages or sick adults."

Detailed descriptions and Drawings are given of the belt and various modifications, also of the means of using it and applying it to the bath.

" When the bathing belt is to be adapted to furnish static " electrical effects, for the sake of economy, the metal in the belt " should be of magnetized steel, and if it is to furnish dynamic " electricity, it should be of iron, steel, or any other conducting " metal, which is to be connected with a current from a chain or " other pile suitable for industrial applications."

" For cases where it is required to communicate electricity to " the bath," without contact with the inventor's apparatus,

" a chain and other galvanic pile" is used, "the conductors of " which are furnished with an impervious muffle or cover, pre- " serving them from communication with the water, and termi- " nating in contact pieces, which may be applied to the part " requiring the electricity." "In order to form each element" of the electric chain, "two blades, zinc and copper, are united by " solder throughout their length, and then divided so as to pro- " duce elements formed of two metals, zinc and copper, which are " connected afterwards end to end, and chaplet-like, by con- " ducting wires." "Such piles need be excited by either vinegar " or other acid."

[Printed, 8*d*.]

A D. 1860, March 22.—N° 748.

PEPPÉ, George Tosco.—" Improvements in the manufacture " of thin sheet lead coated with tin."

This invention consists "in taking advantage of the clean " surfaces of lead consequent on continually cutting such sheets " from the outer suface of a mass or cylinder of lead, in order to " apply thereto coatings of tin by the electro-plating or depositing " process.

" For these purposes as the lead is cut from a mass or cylinder, " and whilst it still retains its bright and clean surfaces, it is " conducted into a suitable solution of tin, in order to have that " metal deposited on to the two surfaces thereof."

The electro-depositing solution used, is, "by preference, stan- " nate of soda, but other solutions may be used, such as the " stannate of potash, or a solution of cyanide of potassium and " tin."

" In cases where it is desired to plate the lead with a thicker " coating of tin than can be deposited upon it during the time it " is passing through the trough in connection with the cutting " machine," the lead is first allowed "to pass through the trough " in order to protect the surface from oxidation by the deposi- " tion of a thin coating of tin;" the sheet lead, as it comes from the machine, is then cut "into pieces of a convenient size," and immersed "in thin" [tin?] "solutions in suitable depositing " troughs, having no connection with the cutting machine." " When a sufficient thickness of the tin coating has been " obtained, the lead is to be passed between aminating rollers

"until it is drawn out to the thinness required." The process of electro-coating with tin and rolling "may be repeated so as to "give any required degree of thickness to the tin coating."

[Printed, 4*d*.]

A.D. 1860 March 24.—N° 764.

PHYSICK, Henry Vernon.—(*Provisional Protection only.*) "Improvements in electric telegraphs, and apparatus connected "therewith."

The Provisional Specification describes and the Drawings show an insulator fastened into an "iron protection," so that the insulator may be preserved "from breakage during transit, as it is "sent in its cover."

The iron casing, cover, or "protection" supports the telegraphic wire, and in ordinary cases merely rests upon the insulator; however, "where the line wire has a tendency to lift the cover from "the insulator," it can be kept down by a screw "pressing "against the curve of the insulator."

The insulator can be easily cleaned, "as the cover with the "line wire attached to it can be readily raised from the insulator."

"The entire insulator is kept dry, and yet the points of contact "between it and the insulator are few and minute."

"A provision can be made against fog entering between the "cover and the insulator," by making the mouth of the insulator nearly to fit the mouth of the iron cover.

[Printed, 6*d*.]

A.D. 1860, March 24.—N° 772.

BLACKBURN, Isaac.—"Improvements in the manufacture of "iron and steel, and in making iron castings."

This invention "is founded upon the well established fact, that "when a compound is subjected to an electrical current its "negative and positive elements are detached from each other."

"Stack furnaces."—A given quantity of fused metal is tapped from the stack furnaces into a suitable vessel, and phosphorus is thrown therein. "After all visible chemical action ceases," the metal is run into suitable moulds.

"Refinery.—When the metal is tapped and the charge about "half run out, the phosphorus is introduced "into the moulds "of the refinery."

"Puddling.—When the metal is thoroughly melted," "the "electric agent, the phosphorus," is introduced into the puddling furnace, "the charge shortly commences boiling and the "whole mass speedily arrives at nature."

"Foundry.—In making iron castings" "the electrisor," phosphorus, must be well stirred "among the molten metal "until all visible chemical action hall have ceased. The metal "having become subverted, and the electrization completed, it is "then run into the mould or moulds in the ordinary manner."

In carrying out this invention, "phosphorus, amorphous "phosphorus, or their oxides," may be used "to create the "electric current." It is preferred to protect "the electrisor" "from the action of the oxygen of the atmosphere by a thin "coating of alumina or other plastic clay."

"The quantity of electrisor to be used" is determined by the quality and quantity of the iron to be electrized.

[Printed, 4d.]

A.D. 1860, April 3.—N° 850.

GILBEE, William Armand (*a communication from Joseph Desgabriel*).—"An improved apparatus for making signals on "railways."

"The apparatus is composed of a cylindrical case perforated "with two diametrically opposite openings, for the passage, "horizontally, of the rays of two lights. This case is enclosed "in a concentric outer case, having three different coloured "lenses round its circumference. The exterior case is fixed on a "post or support in the ground which supports it; and the "inner case, which is movable, turns with the ball or sphere by "which it is surmounted. This ball or sphere is divided into "two hemispheres of very visible colours, which act as signals "by day; the lights serving to transmit the signals by night. "Enclosed in a small case is a clock movement, which by means "of a pinion gearing with a wheel, causes the apparatus to turn "round a central pivot. Stops placed at certain distances apart "on a circular plate above these wheels, prevent this action until "a click lever (in gear with the stops) is drawn back by the "electric current from an electro-magnet placed in the interior "and attracting the click lever towards itself. The electric "current which causes the movement of the signals is put in

" action on the passage of a train, by a projecting arm or other " suitable contrivance fixed to the first carriage of the train. " This arm passes between two iron bars suitably placed in the " road near the signal apparatus, and separates one of them, " which acts on a bell crank lever. This lever moves a horizontal " lever, the opposite extremity of which is thereby raised and put " in contact with the poles of an electric battery. A hook " catches the bell-crank lever when it is displaced by the action " of the cam," [arm ?] "and holds it the required time for " completing the circuit of the electric current in the apparatus, " and until another cam" [arm ?] "of the train disengages it " and breaks the communication of the wires."

[Printed, 8*d*.]

A.D. 1860, April 3.—N° 856.

WALKER, Charles Vincent.—(*Provisional Protection only.*) " Improvements in the manufacture of troughs for receiving " electric telegraph wires."

"This invention has for its object improvements in the manu- " facture of troughs for receiving electric telegraph wires. For " these purposes each length of the wood employed for making " such troughs has cut from it longitudinally a piece triangular " in cross section, thus producing a trough of corresponding form " with inclined sides, and suitable for receiving and containing " insulated electric telegraph wires, and such trough is then " covered by the triangular piece which has been cut out there- " from."

[Printed, 4*d*.]

A.D. 1860, April 12.—N° 912.

NEWBOLD, Charles.—" Improvements in machinery or ap- " paratus for and the method of manufacturing vessels and other " articles."

This invention " consists in forming tubes, pipes, and other " vessels and other articles of paper and paper materials, and " textile or other fabrics, coiled, lapped up, or wound up one layer " over another from a continuous sheet or sheets, web or webs, " length or lengths, which, in the process of being made up into " form, are caused to pass through a bath of hot bitumen or

" mastic, by which the interstices or pores of the material are filled " up, and the material itself preserved from the effects of decay."

" The sockets or other means of connection or fitting together " are formed " in the process of making up such tubes, pipes, and " other similar articles."

" For semicircular troughs or half pipes to be used either for " guttering, eaves, troughs, *or for containing telegraph wires*, or " for other similar purposes," a sheet of paper or other material is coiled " around a core of a suitable diameter," and the core is withdrawn therefrom; the tube is collapsed " to a semicircular " form," and the longitudinal edges are given " the halved, " rebated, filleted, square, or rounded form, as may be required, " by pressure, the half socket being formed in manner similar " to the whole pipe, or it may be formed by pressure applied to " the end; or instead of forming half tubes in the manner just " described, they may be formed by passing sheets of paper or " other material round or over a flat core, and afterwards bending " or shaping them by pressure into the form required."

[Printed, 1*s*. 6*d*.]

A.D. 1860, April 16.—N° 953.

CARPENTIER, JEAN BAPTISTE AUGUSTE.—" A new metrical " apparatus, with table."

" The present invention consists of a box containing a collection " of models by means of which the weights and measures of any " country can be practically taught. It consists of a receptacle " of wood or other material, according to fancy, having a lid " opening so as to form a table on which the different objects may " be placed when required for illustrating. The lid or door is " rendered more solid by means by means of resting hinges; the " interior of the receptacle is divided into compartments, in which " the various models are placed when not required. A rod of iron " or other material is adjusted at the top so as to slide in and " out, and acts as support for the scales; the lid can be closed " by a lock or not, as required. To aid in moving the receptacle " a handle is placed on each side; when required for use it " can be placed on a table or hung on the wall, being furnished " with a ring at the top."

The measures of length, surface, solidity, capacity, and weight are illustrated by models. There is also a " money table."

Among the "various objects" are, "29th, a thermometer "divided after Fahrenheit, Réaumur, and Centigrade; 30th, "*a mariner's compass* with rhomb line; 31st and 32nd, a clock "dial used in illustrating the time, and a compass card showing "the use of the mariner's compass; 33rd, an alcoometer for "illustrating the weight of liquids."

[Printed, *6d.*]

A.D. 1860, April 18.—N° 972.

BROOMAN, Richard Archibald (*a communication from Alfred de Banville and Emile Duclos*).—(*Provisional Protection only.*) "A method of and apparatuses for communicating to "railway passengers the names of the stations which the train "successively approaches."

"This invention consists, first, of a method of communicating "to railway passengers the names of the stations which the train "in which they travel successively approaches, by placing in "each passenger-carriage an apparatus operated upon by the "guard or other official in such manner as to bring the name of "each station in succession into view before the train arrives at "it; and at the same time (where desirable) to strike a bell, or "otherwise act upon a sound-signal for the purpose of calling the "attention of the passengers to the changes which the indications "of the apparatus undergo.

"The invention consists, secondly, of apparatuses for carrying "the first part of the invention into effect. The inventors place "in each carriage an electro-magnet or electro-magnets, and "connect the whole of them by wires, which may be connected "with a battery at the pleasure of the guard or other official. "With each magnet or set of magnets are combined armatures, "levers, click wheels, a bell and hammer, a revolving barrel "carrying the names of the stations, and other like contrivances, "whereby every time the electric circuit of the wires with the "battery is completed, the bell may be made to sound, and the "name of a fresh station be brought to sight."

[Printed, *4d.*]

A.D. 1860, April 20.—N° 994.

SILVER, Hugh Adams, and BARWICK, James.—(*Provisional Protection only.*) The title of this invention is "Improvements in

" moulding India-rubber and other like gums in cells for galvanic
" batteries, and in insulators for telegraph wires."

The inventors state:—" Our invention in moulding consists in " placing india-rubber, gutta percha, or other similar gums, " together with sulphur, in metal moulds, in bringing the moulds " and contents by means of an oven, or otherwise, to a tem- " perature of about 400° Fah., in shaping the article to be " formed by a die corresponding with the intended shape of the " article forced into the mould by pressure, and in plunging the " mould, its contents, and the die, into cold water, or in otherwise " suddenly cooling the same. By our process of moulding we " form the article of hardened gum alone, or we coat metal, metal " cloth and wires either entirely or one side or otherwise partially " only with the gum, the mould being formed to allow of the " gum during the pressure of the die covering the article on one " side, all sides, or in such parts as may be desired.

" Our invention in battery cells consists, in constructing them " of hardened gum, with some porous substance, such as gypsum, " let in at intervals in the sides to allow of the acid solution or " other liquid employed circulating through the whole series of " cells.

" Our improvements in insulators consist in constructing them " of a combination of metal and hardened rubber or other like " gum, whether the combination be effected by causing the rubber " or other like gum to adhere to the metal by moulding under " pressure as herein-before first described or otherwise."

[Printed, 4d.]

A.D. 1860, April 21.—N° 1005.

BUCKWELL, WILLIAM.—" An improved mode of operating " recording or printing telegraphic apparatus."

This invention consists in " operating the circuit breaker of in- " struments for transmitting signals to recording instruments by " means of type or its equivalent."

The composing stick containing the type is carried under " a " small bowle " or roller by means of an endless chain that passes round a pair of chain wheels, " to one of which rotary motion is " given by a winch handle attached to its axle." The above-mentioned " small bowle " or roller is mounted on a bracket that is fixed to a platform carrying a rocking contact lever, and as the

type pass under the "small bowle," "the projections on the face " of the type will, by coming into contact with the bowle," cause the lever "to rock and produce metallic contact with the adjusting " screws. A current of electricity will then be transmitted to the " recording instrument, the duration of which current will (suppo- " sing the chain to be driven at an equable speed) be determined " by the nature of the projection on the face of the type brought " into contact with the bowle."

The type is cast "in the form of single telegraphic letters," and the composing stick has notches on its under side, which fit into cross pins in the links of the chain.

Instead of the above-described arrangement, the type may be set helically round a cylinder or barrel, which is made "to move " in the direction of its axis as well as around its axis, to keep " the helical line of type under the bowle."

[Printed, 10*d*.]

A.D. 1860, April 23.—N° 1008.

PARKINSON, John.—The title of this invention is "Improve- " ments in machinery for separating small particles of iron or " steel from brass and other metals or materials."

The inventor states :—"The object of my invention is prin- " cipally to cleanse brass filings, borings, or turnings, that is to " say, to remove the small particles of steel and iron from them " so that the brass may be again used for making brass castings " or otherwise. In performing my invention, I place a number " of magnets in a spiral line on the circumference of a roller, re- " volving in a trough, one end of which has a hopper, into which " the mixed filings, borings, or turnings are fed, and the other " end is open to discharge them when cleansed. The filings, " borings, or turnings are traversed along the trough by the " magnets. The discharge from the hopper is regulated by an " agitator acted upon by the roller or other part of machinery. " The particles of steel and iron which adhere to the magnets are " brushed off and deposited into a box by a revolving brush or " other suitable agent. It is evident that this improved machi- " nery may be used to separate small particles of iron or steel " from any other metals or materials."

[Printed, 6*d*.]

A.D. 1860, April 25.—N° 1042.

WEST, John George.—The title of this invention is "An im-" provement in compasses."

The inventor states:—"My invention relates to those compasses "in which the bowl is filled with liquid, for the purpose of obtain-" ing steadiness in the card, and it consists in the means hereafter "explained for filling the bowl and maintaining it filled with "liquid free from air or other gaseous bubbles.

"I fit to the bottom of the bowl a disc, by preference of corru-" gated German silver, but a disc or plate of any other substance "which will perform in the manner hereafter stated may be em-" ployed; and I screw on or otherwise fit hermetically to the rim "of the bottom of the bowl a concave or other suitably formed "plate, with an aperture for receiving a connection with an air "pump or other exhausting apparatus or engine. The top of the "bowl is closed and covered by a plate of glass, fitted and "cemented air-tight. Screw plugs are fitted to the side of the "bowl, for the purpose of filling it with liquid through one plug, "and for allowing of the escape of air and any excess of liquid "through the other. The mode of filling is as follows:—The "space between the corrugated plate is exhausted, and liquid, "say clear water and spirit, is admitted through one of the "plugs. A tap in the connection to the air pump or other ex-" hausting agent is now opened and again closed, the pressure "of the atmosphere acting on the back of the plate drives out "any air bubbles that may remain in the bowl, and then the "plugs are hermetically closed. The connection with the air "pump or other exhausting apparatus is now entirely cut off, "when there will be sufficient pressure upon the liquid in the "bowl to prevent the infiltration of air."

[Printed, 6*d*.]

A.D. 1860, April 27.—N° 1069.

FLOIRE, Louis Alexandre.—(*Provisional Protection only.*) "An improved electric break."

In one arrangement, the attraction of an armature by an electro-magnet sets free a system of levers, and allows a heavy sliding piece to descend into gear with a conical screw keyed on to the boss of one of the wheels; the skid levers are thus brought into

action so as to force the skids against the wheels. To withdraw the brakes the movement of the carriage is reversed; a cam on the conical screw raises the sliding piece, and thus places both sets of levers in their original positions. Two electric circuits are used to excite the electro-magnets; in one the electro-magnets are placed one after the other in the same circuit, and the sending of the current causes "a simultaneous locking action;" the other circuit is, in the first instance, limited to the first carriage, but the movement of the first keeper or armature puts the second electro-magnet into circuit, and so on until all the electro-magnets in the train have been excited seriatim.

In another arrangement, the attraction of an armature by an electro-magnet causes a "tongue piece" to engage itself in a screw on the axle of one of the wheels of the carriage; this action disengages a bar, which allows the resistance of the train to act on the skid levers by means of the buffer rods. As soon as the train moves ahead, the buffer rods replace the bar and the "tongue piece" is risen out of the threads of the screw. The electric circuit is made through the traction bar; if the traction bar becomes broken, the drag chain displaces a hook and allows an "elastic metallic plate" "to bear on the other buffer rod, and "so to make the circuit."

[Printed, 6d.]

A.D. 1860, April 28.—N° 1080.

BARR, HENRY JAMES.—(*Provisional Protection only.*) "Improvements in working railway signals, and in apparatus employed therein."

This invention "consists in certain arrangements of apparatuses "whereby a passing train is made to act on an ordinary railway "signal and set it at 'danger,' at which it remains until altered "by hand or from which it is moved to 'all clear' by means of "an electro-magnet acting as soon as the train has reached the "next station or any required distance."

Upon the passing of a train, a projecting arm "affixed to some "portion of the train," causes a wheel, fixed on the ground near the rail, to revolve; an eccentric thereby raises the signal arm to "danger" by means of a lever and "signal-post wheel;" "at the "same time a metal bolt engages in the notch on the periphery "of the signal post wheel, at" [and ?] "retains the signal at

" 'danger.' Over this metal bolt is an electro-magnet, and com-
" munication is opened with a battery, so as to cause the magnet
" to act, and raise the bolt when the train reaches the next station,
" or any desired point; or the bolt is raised by hand. Upon the
" bolt being raised, the signal-post wheel moves back again to its
" original position, and restores the signal to 'all clear.'"

This invention also consists "in causing a fog signal to be
" placed over or on the rail by a passing train simultaneously
" with the signal being placed at 'danger,' and to be withdrawn
" as soon as it is restored to 'all clear.'"

[Printed, 4d.]

A.D. 1860, May 9.—N° 1146.

REID, James.—"Improvements in electric telegraph conduc-
" tors."

The object of this invention is to prevent the formation of interstices between the wires and the insulating materials of the "strand wire conductor" of an electric telegraph cable.

"During the time the action of spinning the conducting core
" is going on," the inventor allows "the several copper or other
" wires of which it is composed to pass separately through a
" trough containing a mixture of the ordinary gums, or any other
" suitable material kept in a heated state, with which each and
" all of the wires that compose the strand are coated while the
" mixture is still warm and in a plastic state, the wires are
" twisted together, so that the whole becomes one solid mass
" through which no water can penetrate; if more convenient the
" heated mixture may be allowed to drop on the wires while in
" the act of being twisted;" or, "the central wire only" may be allowed "to pass through the bath or mixture of gum or com-
" pounds, and while such central wire is hot the other wires
" forming the strand are to be heated and twisted around it. Again,
" to attain the same object," the wires are passed "through a
" vessel containing a mixture of tin and lead, or it may be other
" suitable metals, and while the said metals are in a state of
" fusion" the wires are twisted together, "which become one
" solid mass, in all cases retaining all the strength that is due to
" a strand core."

[Printed, 4d.]

A.D. 1860, May 11.—N° 1164.

GRANTHAM, JOHN, SINNOCK, WILLIAM, and MAGNUS, LAZARUS SIMON.—(*Provisional Protection only.*) "Improve-"ments in the manufacture of wire rope and in machinery for "that purpose, with special application to the manufacture of "telegraph cables."

"By the employment of this invention, the iron wires or bars "used in the manufacture of telegraph cable can be twisted and "the cable made without employing reels or bobbins hitherto "considered necessary to carry each wire, and is especially appli-"cable to the heavier description of cables."

Instead of being mounted on reels, the external wires of the cable are laid straightly in a long tube or shaft capable of revolving on its axis. Suitable means are provided for keeping the said wires from twisting or "shifting their relative position while "passing through the shaft," and for the support of the shaft at intervals, so as to allow of its rotation. A small tube containing the core is placed parallel to the shaft and revolves with it; the axial rotation of this tube is prevented either by means of cams that rub against frames, or by weighting it at its under side; the core is ultimately brought centrical by means of a "separating "plate." The core may be placed in the centre and the wires outside, if preferred.

"Motion being given to the shaft, a draw-off of great power is "applied, and the lay of the rope is perfected by passing the wires "surrounding the core as they leave the register plate through a "tubing apparatus, and then between gripping rollers." As soon as the wires in the shaft are worked off, the machine is stopped and new wires are laid in, from a bench the whole length of the shaft, by a number of men.

To join the wires, they are heated by a blow-pipe furnace and welded by compression.

[Printed, 4*d*.]

A.D. 1860, May 11.—N° 1169.

NEWTON, WILLIAM EDWARD (*a communication from Benjamin H. Wright*).—"Improvements in electric conductors for "telegraphic purposes, and in the apparatus for and mode or "means of transmitting signals between distant places."

1st. "Constructing insulated submarine or subterranean tele-
"graphic cables." A hempen cord or core of the cable is helically wound with two layers of copper conducting wire; the coils of the second layer of wire lay between those of the first layer. A covering of gutta percha is then applied, and, outside of this, tarred cordage is placed longitudinally along the conductor. This cordage is secured by a helically-disposed covering of twine.

2nd. Signal apparatus. A permanent magnet is placed within one of the helices of the electro-magnet. If the current traversing the coil gives the same polarity to its core as is possessed by the permanent magnet, the two magnets repel each other, and the prolonged core of the other helix attracts the permanent magnet. The permanent magnet is mounted on a centre, upon which it can vibrate, and a spring keeps it in a given position when the electro-magnet is inactive.

3rd. Means of transmitting signals through imperfectly insulated conductors. This improved mode of operating consists "in the
"cotemporaneous or simultaneous severing at the sending and
"receiving instrument of the circuit or circuits which are formed,
"and which run in the same direction as that of the battery
"circuit from the point or points where the insulation is not per-
"fect, and which circuit or circuits do not instantaneously cease
"on the opening of the key at the sending station." Resort is had to instruments which break contact, after each signal, at the receiving station, and restore it in time for the next signal to be made. A printing telegraph with this peculiarity is described and shown in detail.

[Printed, 1s. 2d.]

A.D. 1860, May 12.—N° 1178.

CHATTERTON, John, and SMITH, Willoughby.—"Im-
"provements in electric telegraph conductors."

"In preparing strands of wires to be used as electric telegraph
"conductors, in place of laying the outer wires directly on to and
"around the inner or central wire, such central wire is caused to
"pass through and to be coated with a suitable material or com-
"position, preferring for such purpose a mixture of gutta percha,
"Stockholm tar, and resin, in such manner that when the outer
"wires are laid around such inner wire, the outer wires may
"imbed themselves in such coating, whilst in a soft or plastic

" state, by which the passage through a strand will be filled up " and the whole rendered solid. In order to protect gutta percha " or other insulating material when used for coating and insulating " metallic conductors from the effect of heat, beads of wood or of " other suitable non-conductors of heat are threaded or placed on " or around such insulated electric telegraphic conductors, and " over such beads a coating or tube of lead is supplied, or other " coatings may be used. By these means insulated electric tele- " graphic conductors (amongst other advantages) are rendered " more suitable for use in hot climates."

[Printed, 4d.]

A.D. 1860, May 16.—N° 1209.

GUILLEMIN, Claude Marie.—" Improvements in submarine " electric telegraphs."

According to this invention the Leyden-jar charge of a long submarine conductor is not avoided, but is prevented from discharging itself between each signal, thus reducing the work for the battery to do, and accelerating the speed of working.

A cable is employed that consists " of a conducting wire or " strand, suitably covered with insulating material, and around " this wire is placed a metal casing for the conducting wire or " strand, and its insulating covering."

" Before transmitting a signal through the cable, one end of " the insulated metallic casing, vizt., that at the transmitting " station, is placed in connection with one pole of a battery, and " the circuit is completed through the metallic casing and the " earth; the current passing induces into the conductor electri- " city of opposite polarity to that transmitted through the casing. " When a signal is to be transmitted, the contact with the casing " is discontinued, and contact is made with the conductor with " the other pole of the same or another battery, and the signal is " transmitted; as soon as this is effected the conductor is again " disconnected from the battery, and the connection between the " battery and the casing is immediately re-established; this pre- " vents the charge running out of the wire when its connection " with the battery is broken, and the delay arising from the " necessity of charging the wire for each signal is avoided." The metallic casing is formed of a copper ribbon " arranged in close

" coils," the said coils being united by a layer of electro-deposited copper.

If several insulated conducting wires are used in the same cable they are each "worked as above described."

[Printed, 8d.]

A.D. 1860, May 17.—N° 1211.

LOEWENSTEIN, CASPAR.—(*Provisional Protection only.*) "Improvements in arrangements for paying-out submarine cables."

"This invention consists of a paying-out machine simply contrived as follows:—A turn is given to the cable round an ordinary grooved wheel at the stern of the vessel from which the cable is to be paid out. On the axle of this wheel, and either on each or on one side of it, is placed a heavy bent lever having its fulcrum forward of the wheel securely bolted to the ship, but of course allowing the lever to move freely upon it. Over this lever hangs a heavy pendulum mounted upon bearings set in a frame on each side of the lever, having a friction roller at the bottom of the ball to prevent it jamming, the pendulum being free to move upon its axle, and at the same time of great weight, retains always its vertical position and presses the lever down upon the axis of the grooved wheel, round which the cable passes, so as to form a self-acting break. When the stern of the vessel sinks, the lever sinking with it, while the pendulum remains vertical the curved part of the lever receives the ball of the pendulum, thus increasing the distance of the power (the weight of the pendulum) from the fulcrum and so exerting more force to break the wheel, and thus slow the paying-out. When the stern rises the reverse action takes place and the cable pays out more freely. The pendulum is contrived so as to enable its weight to be varied for the purpose of adjustment for varying depths of water."

[Printed, 4d.]

A.D. 1860, May 19.—N° 1238.

NEWTON, WILLIAM EDWARD (*a communication from Thomas Crossley*).—"Improvements in printing blocks for printing fibrous and textile fabrics."

"This invention consists in the production of an electrotype

" printing block, having a plain face with margins of metal and
" the body of felt or its equivalent, and highly raised above its
" base, and having perpendicular sides."

A mould corresponding with the design is set up with types of three different heights. A matrix of the mould is produced in wax and metallized by means of plumbago; " the matrix is placed
" in the battery, and the metal precipitated upon it in the usual
" way of electrotyping, and a thin fac-simile in reverse of the
" matrix is produced in copper or other metal, into the back of
" which is run type or other suitable strengthening metal, and
" this is then fastened to a wooden block or back, and is ready to
" be used for printing with.

" The blocks are made in sections, and they are arranged on a
" platen so as to present a form of about 60 by 30 inches, but
" they may be extended to two, three, or more yards in length,
" whilst with wooden blocks such a thing would be impracticable,
" owing to their unequal swelling, shrinking, and warping. A
" cylindrical form may be thus made up of sections prepared in
" the same manner as the flat blocks, and advantageously used in
" printing certain fabrics which are now printed by engraved or
" embossed cylinders."

" The types are all rectangular, and square or oblong, and any
" figure or pattern drawn upon right lined paper may be set up
" with such type; but the present invention is not limited to the
" shape of the type, except as to height and perpendicular sides."

[Printed, 8*d*.]

A.D. 1860, May 23.—N° 1271.

BURNETT, William Hickling.—" Improvements in electric
" telegraphs and in apparatuses employed therewith, a part of
" which improvements is applicable to the winding of clockwork."

This invention relates:—

1st. To certain " pulsation distributors " " for enabling several
" telegraphs to be worked simultaneously or nearly so, and some
" periodically, with only one line wire."

2nd. " To an improved mode of maintaining in action the said
" apparatuses, which mode is also applicable to clocks, and gene-
" rally to those telegraphic and other instruments in which clock-
" work is used."

3rd. " To an improved mode of insuring that such instruments shall for all practical purposes work synchronously."

4th. To manipulators used with the "distributors."

5th. To receiving instruments used with the "distributors."

6th. To a method of "bringing local batteries into action for "any desired period."

7th. To a mode of "working telegraphs simultaneously from "both ends of one wire." This portion of the invention is only set forth in the Provisional Specification.

"*Pulsation Distributors.*" The "pulsation distributors" are "kept in synchronous revolution" at all the stations, and "are "so arranged as to send particular pulsations from given mani-"pulators to the receivers of the stations with which they are "intended to correspond, and no others. This is effected by "drawing off pulsations from different points of a revolving "wheel or cylinder, and conducting some of these pulsations "to one manipulator and some to another, after which they are "led to the line and earth, and removed at synchronous "points of the revolution of the wheels or cylinders belonging "to the receiving stations."

Instead of having the electric current always available for sending or receiving signals at each station, a series of currents or pulsations may be allotted periodically to the stations consecutively. This is accomplished by drawing off the currents to a slow-moving wheel instead of to the manipulating or receiving instrument; the duration of contact of a spring with one of a number of extended teeth on the wheel determines the length of time that signals can be sent to or received from a particular station.

The momentary pulsations or currents from the line wire may be prolonged into currents of sufficient duration to work the receiving instruments efficiently, by means of a relay, revolving wheel, and local battery; the current that really works the receiving instrument is that from the local battery.

In the case of working a series of stations by means of the "pulsation distributors," and when both positive and negative currents are required to actuate the receiving instruments, the revolving wheel at the station from which the pulsations are distributed has double the number of teeth that would be required if only currents of one denomination were used to make the signals, but "double simultaneous contacts" are formed, so that either positive or negative currents may have the opportunity of being transmitted, according to the signal to be sent.

In distributing currents to the various parts of a receiving or recording instrument, the teeth on the revolving wheel are sometimes used as cams to tilt levers into mercury, and thus to complete the requisite circuits.

The pulsation distributors may be either driven by clockwork or by a spring wound up by an electro-magnet which is actuated by a local battery.

"The practically synchronous working of similar clockwork "instruments" is ensured by causing "a fresh simultaneous start "in the various instruments at intervals by a pulsation of the "current once or more during the revolution of similar wheels in "the different instruments."

Extra means of communicating between certain stations may be obtained by using the intervals of wire that have done their work in any one distribution. These intervals are worked from batteries at intermediate stations by means of relays.

A portion of the pulsations may be made from one end of the line and a portion from the other. The method of accomplishing this set forth in the Provisional Specification "consists in op- "posing a mechanical resistance such as a weight or spring, for "instance, to the power of the home circuit, so as to prevent it "from indicating its passage through the receiving instrument "and the exertion of such mechanical force to indicate in lieu "of the current from the distant station when such current is "stopped by an opposing current sent."

Relays.—Relays are used, in connection with revolving wheels, either to distribute currents to work dot and printing receiving instruments, or to complete prolonged local circuits by means of the momentary impulses from the line wire. In the latter case the position of a pin on the revolving wheel and its speed determines the duration of the current.

In one relay the prolonged contacts are made by the deflection of permanent magnets against stops by means of line-wire electro-magnets.

In a second relay, line-wire galvanometer coils and magnetized needles are used.

A third relay depends upon the action of electro-magnets upon one another, the said electro-magnets being formed by the line-wire current acting in conjunction with the local current. This instrument is used for making local printing-machine contacts.

A fourth relay for working instruments which mark across the

paper, or for actuating a type printer operated by pulsations of one denomination, consists of an electro-magnet with a jointed armature and contact pins.

Manipulators.—In these instruments an electro-magnet, worked by a local current sent by the revolving apparatus at the proper time, locks "turning plates" until all the requisite pulsations to form a letter have passed through the manipulator. Bells or a pointer, worked by the above electro-magnet, indicate whether the keys are locked or free.

In one manipulator six keys are used; these correspond to the three positive and three negative currents required (possibly) for signalling at the receiving station. The six keys press twelve springs upon fixed pieces of brass, and thus complete the circuits; the springs are in contact with the battery and the brass pieces with the telegraphic circuit; certain pieces of wire are soldered across the springs to couple them suitably together, electrically speaking.

In a second manipulator six keys are also used. The keys are non-conducting, with pieces of brass inlaid, and they are mounted on an axis; a reaction spring (one to each key) returns each of them. Metal portions of the keys are connected with the telegraphic circuit, and springs, against which the metal portions are brought by depressing the keys, are in contact with the battery poles.

A third manipulator has a key for each letter acting on "turning plates" to make the contacts.

A fourth manipulator also sends all the currents for each letter by a single touch. The contacts and combinations of pulsations are formed by means of "turning frames."

Receiving instruments.—The needle instrument preferred to be used in carrying out this invention consists of three galvanometer needles. The symbols for each letter are at once indicated, without any repetition of beats, by means of not more than three pulsations; either positive or negative or a combination of positive and negative pulsations are sent through one line wire, according to the letter to be signalled. This instrument may either be worked by the line-wire circuit or by a relay circuit.

In the first "dot pricking" instrument two needles are used; one needle is circular in cross section for the positive currents, the other is lozenge-shaped in cross section for the negative currents; one needle pricks from back to front, the other from front

to back of the paper. The paper is divided into spaces and the letter is in part signified by the place of the prick or pricks within the space. The pricks are consecutive and lengthwise of the paper. By means of a local current and revolving wheel, a vertical electro-magnet is made to vibrate between two horizontal electro-magnets, and thus the prickers are actuated (through the medium of levers) according to the direction of deflection of the vertical electro-magnet; another electro-magnet moves the paper by means of a rocking frame, spring, and ratchet wheel.

In the second "dot pricking" instrument a number of needles prick simultaneously (or nearly so) across the paper. Electro-magnets, mounted on centres, are made to vibrate in accordance with the local current that passes through them and through fixed electro-magnets near them; thus the pricker frames are moved into the right position, the paper is pricked, and it is then moved forward to be ready for the next letter. The motion of the paper is accomplished by a local current from a revolving wheel at suitable intervals of time.

In a type-printing instrument a "type block" is used to print from, instead of a type wheel. The proper type is brought under the "striker" by means of electro-magnets mounted on rocking frames, the currents through the said electro-magnets being suitably combined; the "striker" is worked by another electro-magnet, and the paper is advanced by the recal of its armature. The "type block" may print either by means of electro-chemical decomposition or by means of a strip of blacked paper placed between the type and the strip on which the dispatch is printed; in the former arrangement the paper is mounted on suitable rollers and passed into a trough containing the chemical solution, it is then squeezed by squeezing rollers, passed under the metallic stamper and on to the winding pulley; in the latter arrangement a solid striker, armed with India-rubber, is used.

In an electro-chemical decomposition dot instrument the alphabets employed may either have the dots consecutive and lengthwise of the paper, or across, or made with all positive or all negative currents, or partly with positive and partly with negative currents, or of different colours and forms. The markers are actuated by an electro-magnet in combination with wheelwork; five markers are shown, and according to the number and direction of the pulsations for a given letter, so is the number and situation of the markers called into action. The paper is advanced

by a "turning plate" fixed to the armature of a local electro-magnet.

In this bulky Specification many details and Drawings are given of the principles and action of the above-described apparatus; also many modifications of the same are suggested and set forth at length.

[Printed, 9*s.* 2*d.* Drawings.]

A.D. 1860, May 23.—N° 1275.

COLLYER, Robert Hanham.—"Improvements in the manu-"facture of tubes and other vessels and other articles, and in the "machinery and apparatus connected therewith." One of the applications of this invention, mentioned in the Final Specification, is for forming "troughs or channels for containing electric "telegraph wires."

"This invention relates to the employment of and to the modes "or methods of using fibrous and other materials of short length "or staple, in combination with bitumen, bituminous compounds, "or mastics, for the purpose of forming tubes and other vessels."

The material employed consists of straw or other vegetable fibre prepared according to processes patented by the inventor on February 29th and March 28th, 1860, respectively; the material thus prepared is immersed in the cauldron of bituminous composition, and is incorporated therewith at a suitable temperature. Instead of straw, hemp in the condition of paper-maker's pulp may be used. Other materials and combinations of materials are set forth at length in the Final Specification.

For forming tubes, pipes, and troughs for telegraph wires a piston and cylinder arrangement is used, suitable dies being fitted on one end of the cylinder. The piston and piston rod are made hollow, and the piston rod is divided longitudinally "for the pur-"pose of ensuring a perfect circulation of steam through the "piston. By means of hydraulic pressure applied through a ram "acting upon the end of the piston or plunger rod, the requisite "amount of force is applied to the material for forcing it through "the die, and by which the requisite density is imparted to the "articles manufactured."

The application of this invention to the manufacture of other articles is fully set forth.

[Printed, 6*d.* No Drawings.]

A.D. 1860, May 29.—N° 1329.

COLLYER, Robert Hanham.—"Improvements in telegraph "cables, also applicable to other similar purposes."

The insulating material employed consists of bitumen, shellac, and oil, together with the short hair of animals and "a sufficient "quantity of calcareous matter to temper the composition to the "requisite degree of hardness and solidity." The whole mass is intimately mixed, and, if it is intended to be stored away, the air is exhausted from it before it is cool, and it is allowed to consolidate in the form of blocks.

Instead of the above-described insulating material, paper pulp, prepared in accordance with the methods patented by the inventor on February 29th and March 28th, 1860, respectively, may be dried and then mixed "with the mastic composition before "mentioned."

The insulating composition is heated to a semi-fluid state and forced, under considerable pressure, into tapering tubes and dies, in the centre of which the metallic conductor is placed.

Before the conductor "is permitted to enter the mass of mate-"rial by which it is to be surrounded," it is heated and passed through a solvent of the insulating material.

Whenever independent conducting wires "have to be combined "within one insulating mass in the form of a cable," the insulating coat of each is formed singly, and is oxidized by means of currents of air; the conductors are then suitably combined by being passed through dies and between rollers.

During the process of covering, an exhauster withdraws the air from the semi-fluid mass.

Either metallic wires or tubes charged with the insulating material may be used as conductors.

[Printed, 4*d*. No Drawings.]

A.D. 1860, June 6.—N° 1385.

HUGHES, Edward Thomas (*a communication from Joseph Corduan*).—"Improvements in coating or plating the faces of "printing type and stereotype plates."

The types to be coated are fastened in a frame, or by means of wires, so that the letter faces are all in one plane. The faces of the types only, are then immersed in an electro-depositing solution, and the ordinary connections made with the source of electric

power that is used; an anode of the alloy to be electro-deposited is employed.

The electro-brassing solution is made in two portions; one portion consists of a solution of black oxide of copper in cyanide of potassium, the other portion of a solution of white oxide of zinc in cyanide of potassium. The hardness of the resulting deposit is regulated by the proportions of these two solutions used to form the electro-brassing solution.

To electro-deposit an alloy of copper, zinc, and iron, a solution is used that contains "prussate" [prussiate?] of iron, white oxide of zinc, black oxide of copper, and cyanide of potassium.

To electro-deposit "key metal," a mixture of cyanide of potassium, black oxide of copper, and chloride of tin is used.

To electro-deposit an alloy of tin and zinc, chloride of tin and white oxide of zinc are dissolved in a hot saturated solution of cyanide of potassium.

Either galvanic batteries or a magneto-electric machine may be used as the source of electric power.

[Printed, 4*d*. No Drawings.]

A.D. 1860, June 7.—N° 1403.

CLARK, WILLIAM (*a communication from Pier Alberto Balestrini.*)—(*Provisional Protection only.*) "Improvements in electric "telegraph apparatus."

This invention relates to a manipulating apparatus, furnished with a finger key to each letter, for working Morse's lever stroke-and-dot receiving instrument.

The apparatus consists of a small wooden box, having a base of considerable thickness, and divided into thirty-two compartments by means of metal partitions. Thirty-two vertical rods or keys (corresponding to thirty-two signals) are pressed against the cover of the box by the same number of helical springs, the rods being preserved in a vertical position by T pieces at their ends engaging in grooves, made for the purpose, in the holes that are bored in the thick bottom of the box to act as guides. Each compartment is fitted with a "type," against which a cam on the vertical rod is made to slide when the key is depressed; the "type" has such conducting and non-conducting portions as will enable the requisite currents for marking the corresponding letter at the receiving station to be sent through the telegraphic

circuit. The "type" has a spring, and is mounted as a pendulum, so that on the rising of the key a non-conducting portion of the cam comes into contact with the back of the active portion of the type, and no current is sent through the telegraphic circuit.

A bell apparatus and an apparatus for alternate currents is also mentioned in this Provisional Specification.

[Printed, 8*d*. Drawing.]

A.D. 1860, June 12.—N° 1440.

LOEWENSTEIN, CASPAR.—"Improvements in arrangements "for paying-out submarine cables."

This invention consists of the use of a brake apparatus regulated by a pendulum, "to prevent the breaking of the cable by "any sudden strain arising from the rise and fall of the stern of "the vessel."

"The cable as it is payed out is caused to pass around a grooved "wheel or drum," "over which also in a separate groove passes a "break strap," "one end of which is connected to the head" "of a heavy pendulum," "mounted on an axis carried in bear-"ings, and the other end of the break strap is connected to the "axletree of a break wheel." "The head of the pendulum is "made circular, and as the pendulum falls towards the break "drum," "the strap" "becomes wound partially around the head "of the pendulum, and is thus drawn tighter. When the pen-"dulum falls in the contrary direction the strap is unwound "from the head, and is thus slackened."

"The break is in the first place adjusted to give the required "amount of strain for a smooth sea, when the vessel had" [has?] "no rolling or pitching motion." "The axis of suspension lies "athwartships, so that the direction of motion of the pendulum "may be in the direction of stem and stern. The pendulum "being free to move upon its axis maintains its vertical position, "notwithstanding the pitching of the vessel, consequently, when "the stern sinks the break bears with a greater force upon the "drum;" when the stern rises "the strain of the break upon "the drum decreases."

[Printed, 8*d*. Drawing.]

A.D. 1860, June 22.—N° 1515.

MORRIS, William, and MAPPLE, Henry.—(*Provisional Protection only.*) "Improvements in apparatus for electric clocks "and telegraphs."

"1st, causing the impulse weight or spring to give its impulse "to the pendulam when the pendulam is moving in the direction "of the impulse.

"2nd, causing an electro-magnet which gives motion to the "train of a clock to raise the weight or spring which gives im-"pulse to the pendulam." In this arrangement only one electro-magnet is used.

"3rd, placing a stop on the handle of a telegraph instrument,' "which at each to-and-fro movement of the handle strikes "against an elastic buffer."

"4th, making the soft iron piece that swings on the staff pivots "of such a form at the end near the permanent induction magnet, "and so placing the piece as to cause the attraction of the induc-"tion magnet partially or wholly to bear up the weight of the "piece and staff, and to retain the staff in a proper position "pressing gently towards one end or point.

"5th, making the supporters of the insulators on telegraph "posts of one piece, spanning or grasping the post, so as to carry "several insulators with few bolts or borings.

"6th, uniting the metal support pieces to earthenware insu-"lators by imbedding them in the insulators at the time of "making.

"7th, imbedding pieces of graphite, plumbago, charcoal, coke, "or other carbonic substances, to form one pole of a battery in "the surface of a vessel of glass, clay, slag, or earthenware, when "in a plastic state, so as to contain the acid."

[Printed, 4*d*. No Drawings.]

A.D. 1860, June 22.—N° 1523.

GRATTAN, Nicholas.—(*Provisional Protection only.*) The title of this invention is "Improvements in gilding steel and other "metals."

The inventor states:—"This invention has for its object im-"provements in gilding steel and other metals. For this purpose "I employ a solution of sulpho-cyanide of gold, prepared by "adding sulphuric acid to a solution of cyanide of gold in "cyanide of potassium, and I employ this solution by immersing

" in the solution the steel or other metal article to the " [be?] " gilded, and attaching to it by a wire a small piece of zinc, also " immersed in the liquid; a galvanic action is thus established in " the liquid itself, the metal article being the positive pole" [negative plate?] " and the zinc the negative" [positive plate?]. " During this action a coating of gold is deposited on the steel or " other article, which adheres so firmly thereto, even should the " article be of steel, that it cannot be removed except by absolute " abrasion. By no process heretofore employed can a coating of " gold of any thickness be produced on steel so as to adhere to it " at all firmly."

[Printed, 4d. No Drawings.]

A.D. 1860, June 23.—N° 1531.

JOBSON, Robert.—(*Provisional Protection only.*) " Improve- " ments in moulding articles of earthenware or porcelain," some of which improvements are applicable to the manufacture of telegraphic insulators.

" When hollow articles of earthenware or porcelain are " moulded from dry or partially dry clay, by means of a die or " mould and plunger," the plunger is made of two parts. The interior or body of the plunger is conical and smaller in diameter than the article to be moulded, and a split metal ring is forced on to the said body, a feather on the body fitting accurately into the split portion of the ring. When this compound plunger is to be withdrawn from the mould, " the ring by a suitable contrivance, " is held down, while the body is partly withdrawn; the ring then " immediately springs in and clears the article, and is then easily " withdrawn without injury. In place of employing a spring " ring, as above described, the ring may be made in several parts " arranged around a body, and when this is withdrawn or partially " withdrawn, the parts being capable of moving inwards deliver " as already described. When, as in the manufacture of tele- " graphic insulators, it is required to produce two cups, one " within the other, the inner cup springing from the bottom of " the outer, then the portion of the plunger which produces the " exterior of the inner cup is similarly retained in the mould, " while the body of the plunger is withdrawn, and this part then " springs or moves outwards, so as to clear the article, as already " described."

[Printed, 4d. No Drawings.]

A.D. 1860, June 25.—N° 1546.

HOOPER, William.—"Improvements in reworking com-
" pounds of India-rubber and sulphur, and in insulating tele-
" graphic wires or conductors."

1st. "Reworking compounds of india-rubber and sulphur." Unreduced or unground waste is reduced to a pulp by grinding it between heated rollers with naptha or other solvent; raw India-rubber and sulphur is then added to the pulp, the grinding is continued, and the whole is brought to the form desired. The product is "subjected to heat and cured in the ordinary manner."

2nd. Insulating telegraphic conductors. "Applying to the
" conductor a varnish capable of preventing the sulphur in the
" insulating coating from acting injuriously on the conductor."
The varnish preferred is "composed of oxide of zinc and
" shellac dissolved in methylated spirits of wine." A lapping of cotton yarn is first applied to the conductor, and then the varnish. A narrow fillet of India-rubber is then lapped on so that the edges overlap; the said fillet is kept on the stretch as it is wound round. Lastly, the outer coating of India-rubber and sulphur is applied, and the whole is subjected to heat "to convert
" or cure the compound of india-rubber."

3rd. "Making joints in parts of an electric telegraph cable." The ends of the metal conductors are soldered together; the joint is protected from the action of sulphur, as before described, and is coated "with india-rubber uncombined with sulphur to insu-
" late the same;" a coating of "a suitable compound of india-
" rubber and sulphur" is then applied; lastly, a "sheet of
" vulcanized india-rubber" is placed over the whole, and the joint is submitted to heat.

[Printed, 4*d*. No Drawings.]

A.D. 1860, June 27.—N° 1560.

MACINTOSH, John.—"Improved compounds for coating or
" insulating submarine or other telegraphic wires; also in render-
" ing the gutta percha or India-rubber coatings of telegraphic
" wires impervious."

1st. Rendering the above-mentioned coatings impervious. The gutta percha or India-rubber is mixed with paraffine or stearic acid "by masticating or grinding machinery," prior to coating the telegraph wires with it.

2nd. "Rendering telegraphic cables more impervious and "durable by surrounding them with yarn, fillets, or ribbons "made of cords, strands of hemp, or other fibrous materials "saturated with paraffine or stearic acid in combination with or "without india-rubber." The fibrous materials are immersed into the steam-heated paraffine or stearic acid, and the superfluous liquid is taken off by passing the said fibrous materials through suitable orifices. A coating of India-rubber or of its compounds "is put over the fibrous materials so as to render them sufficiently "adhesive to be put on the cable by grooved rollers of" [or ?] "other suitable means. An outer coating of india-rubber, or "compounds of india-rubber is put on and vulcanized or cured," as described in N° 2866 (A.D. 1857), "which renders them not "liable to be injured by tropical heat, and may be punctured "several times in the inch without admitting water from its "superior power of contraction caused by vulcanization."

[Printed, 4d. No Drawings.]

A.D. 1860, June 27.—N° 1561.

EVANS, John Campbell.—"Improvements in machinery or "apparatus for rolling or drawing metals and other substances, "partly applicable to the covering of electric telegraphic cables, "and to the manufacture of wire and other ropes."

"This peculiar arrangement consists in the employment of "three or more rolls driven by suitable gearing, the axes of which "rolls are placed at any" slight "angle with the substance to be "rolled or operated upon." "The metal rod or other article to "be operated upon is introduced into the aperture formed by the "conjunction of the contiguous sides or surfaces of the three "rolls, which by reason of their angular position as regards the "material under treatment will not only roll it of a circular "form or section, reducing it more or less in diameter, but will at "the same time propel or feed such material along, thereby, in "the case of rope-making, or in the covering or lapping of sub-"marine electric telegraph cables, dispensing with the mechanism "hitherto employed for drawing forward the cable or rope as fast "as it is covered or twisted."

"The standards or supports which carry the rolls may be either "stationary or made to revolve as required."

[Printed, 8d. Drawing.]

A.D. 1860, July 3.—N° 1603.

REID, Robert Nicol.—The title of this invention is "Improvements in insulators for electric telegraph purposes."

The inventor states:—"My invention relates to insulators used "for supporting telegraph wires, such insulators being made of "glass, porcelain, china, earthenware, vulcanite, or stone, and consists of a peculiar manner of fixing the bolts or fastenings into "such insulators, which are subject to fracture by reason of the "expansion and contraction of the insulator on a hard substance, "such bolts or fastenings being usually secured therein by "cement. I am aware it has been proposed to employ a yielding "substance to bind these bolts in the insulators, which, although "of a yielding nature, had not been sufficiently resilient to "maintain the requisite hold between the insulator and the bolt.

"Now my invention consists in applying a thickness of india-"rubber or similarly elastic substance around the neck and head "of the bolt inserted in the insulator, and around this I fill in "suitable cement, by which the junction is rendered complete.

"Instead of placing the thickness of india-rubber between "the metal of the bolt and the cement, it may be disposed "between the cement and the material of the insulator, the "cement in this case being in contact with the metal of the bolt. "In either case the india-rubber or other suitable elastic sub-"stance so disposed yields sufficiently to prevent fracture of the "insulator from expansion or contraction, while at same time it "maintains the requisite hold between it and the bolt during "any degree of expansion or contraction to which it may be "subject."

[Printed, 4d. No Drawings.]

A.D. 1860, July 5.—N° 1626.

KROTKOFF, Serge.—(*Provisional Protection only.*) The title of this invention is "Improvements in apparatus for employing "the electric light."

The inventor states:—"The following are the advantages "which accrue from my improved apparatus for the electric "light:—

"1st, to diffuse the light equally on the entire space of which "the electric light occupies the centre.

"2nd, to render the luminous rays supportable to the naked "eye.

"And, 3rd, to collect or unite an undetermined number of the "lights, which separately and collectively would participate in "these advantages.

"The above improvements are obtained by means of one or "more reflectors acting circularly in open spaces, and to which "are added for covered spaces, such as towns, reflectors acting "obliquely to light up the street and interior of houses."

[Printed, 4d. No Drawings.]

A.D. 1860, July 16.—N° 1717.

BAUER, WILLIAM.—(*Provisional Protection only.*) "A new "method of laying down and raising or cutting off, for repairing "and other purposes, of telegraph cables, chains, or ropes."

1st. Preventing the torsion of telegraph cables. The cable is floated in a reservoir in the paying-out vessel; for this purpose it (the cable) is wound upon "a hollow ball or cylinder," the specific gravity of which is so small as not only to float itself but the cable also. The cable passes through suitable guides at a certain height and the tendency to torsion is removed "by the "ball or cylinder, being allowed to float freely in any direction "or round its axis."

2nd. "Cutting, raising, or laying telegraph cables, chains, or "ropes, by means of electro-magnetism, repulsion, or expansion, "produced by water, air, rockets, and springs." "The apparatus "consists of two pair of moveable tongs in connection with a "strong cylinder and a rotating or straight saw or cutter with "the necessary gearings and guides. This small machine will be "lowered to the telegraph cable, chain, or rope alongside of the "connection of the grasp or anchor, which take hold of the "cable at the bottom or in water. The carrying rope of this "machine contains a telegraph wire to enable the putting in "motion of the saw or cutter after the above-mentioned tongs "have taken hold of the cable, chain, or rope to cut it off. The "ends of it can then be raised by direct pulling on the now "connected tongs and ropes."

Various applications of the invention set forth in N° 590 (A.D. 1860) to this invention are mentioned in this Provisional Specification.

[Printed, 4d. No Drawings.]

A.D. 1860, July 20.—N° 1765.

NEWTON, Alfred Vincent (*a communication from Giovanni Caselli*).—(*Provisional Protection only.*) "Improvements in the "manufacture of apparatus for regulating the force of electric "currents."

To form a rheostat, a semi-metallic fabric is "placed in a "wooden box, upon the outside of which copper studs are set in "metallic communication with the different sections of the wires "of the cloth." The cloth "is woven in such manner that the "contiguous portions of wire laid in the cloth will be separated "by a cotton weft thread."

"Instead of employing the process of weaving in the manu-"facture of the improved rheostat, the following mode of "working may be adopted:—Two parallel rows of pins are set "in a board, and over or between these a strip of paper of suit-"able width is placed, so as to leave the pins uncovered. Round "these pins the wire is wound in a zig-zag form. Gum lac "varnish is then to be laid upon the wire in order to cause it to "adhere to the paper, and to insulate it, and before the varnish "is dry another sheet of paper is laid over the wire. When the "whole is quite dry the pins are to be withdrawn from the board, "and a kind of rheostatic cloth is obtained, which may be placed "in the wooden box above mentioned."

[Printed, 4*d*. No Drawings.]

A.D. 1860, July 25.—N° 1800.

MENNONS, Marc Antoine François (*a communication from Edouard Eugène Raynal and Emile Bellot*).—(*Letters Patent void for want of Final Specification.*) "Improvements in etching "on zinc."

"The zinc plate to be operated on being planished and trimmed "in the usual way is coated on one side with varnish, and sub-"mitted to the action of an ordinary tinting or grounding appa-"ratus. The design to be reproduced, previously traced on "transfer paper, is counterdrawn on the plate thus prepared, and "the darkest shades are stopped out by an acid-resisting varnish, "laid on by a hair pencil. This done, and the varnish dried, the "plate is bordered with wax, and covered with dilute acid, the "action of which is aided by a current of voltaic electricity, the "positive (zinc) element" [negative element?] "of the battery

" being placed in communication with the plate, and the negative " " [positive?] "with the acid solution." After a sufficient time of action " the liquid is removed, and the plate washed and dried. " The second tints of the design are then stopped out, as above, " by a further application of varnish, the etching solution poured " on, the voltaic contacts made, and the action kept up so long as " may be necessary to deepen and widen to the desired point the " remaining ground lines. The plate is again drained off, washed " and dried, and the same series of processes repeated till the " required number of gradations are obtained, the pure whites " or blanks, which are reserved for the last, being produced by " scraping the varnish from the desired points previous to the " final exposure to the etching solution. The plate being then " cleaned is ready to be employed for general printing purposes."

[Printed, 4d. No Drawings.]

A.D. 1860, August 1.—N° 1862.

WHITEHOUSE, Edward Orange Wildman. — (*Provisional Protection only.*) " Improvements in testing insulated " conductors."

This invention " has for its object the detection of any " displacement or departure of the conducting wire from its " true position in the centre of the mass of the insulating " material, and consists in placing parallel with the wire to be " tested, and within a short distance, a fixed conducting wire " rod or bar, which is made to form part of the same circuit " as that of the insulated conductor, or of the circuit parallel " therewith. Between these two conductors is placed a magnetic " needle, and the circuit with a battery is arranged so that the " effect of one of the conductors upon the needle shall accurately " compensate or neutralize that of the other so long as the relative " distances of the two from the needle shall remain unaltered. " Now, if the insulated conductor to be tested being always " maintained, so far as its outer covering is concerned, at the " same distance from the needle, be made to pass lengthwise in " the direction of its own axis, any improper or faulty centreing " of the wire will be made manifest by the disturbance of the " equilibrium previously existing, and by the consequent deflection of the needle from the zero at which it stood."

[Printed, 4d. No Drawings.]

A.D. 1860, August 8.—N° 1918.

GISBORNE, John Sacheverell.—(*Provisional Protection only.*) The title of this invention is "Improvements in apparatus "for supporting or carrying electrical conductors for telegraphic "communication."

The inventor states :—"This invention relates to improve-"ments in the construction of insulators or apparatus for carrying "electric, magnetic, or other telegraphic lines, and consists of a "bell or dome-shaped cup, with a hollow projection downwards "from the inside, and two or more studs or projections on the "top, with one or more cross holes or apertures in the same. "The hollow projection downwards receives the usual bracket "fixed in, or to a post or wall, and when both the bracket and "wire supporter are of metal (which I prefer), I coat the end of "the bracket or inside of the downward projection with india-"rubber, gutta percha, glass, porcelain, or other non-conducting "material. The lines or conducting mediums are passed betwixt "the studs or projections on the top, and when stretched a key, "cotter, screw, or like binder of steel, iron, wood, bone, or other "substance is placed in the cross holes, and made fast, thereby "preventing the line from moving out of its place, and this "security is further augmented by slightly curving the top "of the dome or bell downwards, so that the cotter, screw, "or other arrangement may depress that part of the line "acted on."

[Printed, 4*d*. No Drawings.]

A.D. 1860, August 15.—N° 1978.

GODEFROY, Peter Augustin.—"Improvements in the mode "of insulating and laying down inland telegraphic wire."

The wire is first covered with coarse unbleached cotton; suitable lengths of this wire are then strained within metallic or earthen-ware tubes and insulated by pouring into the said tubes a mixture of coal pitch and wood tar. The tubes are then heated "so as to insure the flowing of the insulating matter freely "through and around the whole of the wires, that when cold the "wires are embedded in or between a solid mass of the insulating "material from top to bottom, or from end to end; the tubes or "pipes are then ready for laying down." The tubes are then laid in trenches and the wires joined, the joints being bound with

the same material as that used on the lengths. Two hollow semicircular pieces of iron are made to cover the joint, which is insulated by pouring the hot insulating material into the vacant space surrounding the joint. The semicircular pieces are removed and a collar (previously slipped over one of the tubes) is drawn over the joint "so as to form a cover and protection to the "parts joined as above." Finally, each of the ends of the metal covering is caulked with white lead and hemp.

The wires may either be joined in the usual way, or their bevilled edges placed together, covered with a tube, and the whole forced into one solid mass "by any convenient pressure."

When flexible tubular insulation is required, the conductors are supported by wooden balls within leaden pipes which are afterwards filled with insulating material.

[Printed, 4d. No Drawings.]

A.D. 1860, August 23.—N° 2027.

WHITEHOUSE, EDWARD ORANGE WILDMAN.—"Improve-"ments in testing insulated conductors."

This invention refers to testing the joints of electric telegraph cables.

The principle of this invention is, "to separate the current "lost at the joint from the sum of that lost upon the rest of the "cable, and to examine it by the use of a separate instrument. "This is most simply effected by insulating the trough or reser-"voir into which the joint is plunged for testing and conveying "the current (so caught) through a very sensitive galvanometer "to earth."

In one plan, according to this principle, for the simplest form of testing, one battery pole is in connection with an earth plate, the other with one end of the cable; the other end of the cable is insulated, the joint is immersed in an insulated trough of water, and the circuit is completed by connecting the water with an earth plate by means of a galvanometer. It will be observed that the galvanometer is placed in the part of the circuit nearest the joint, instead of next to the battery as is usually the case.

In a second plan the portion of the circuit between the trough and the earth is occupied by the battery; the galvanometer is connected with the short end of the cable and with an earth plate.

A third plan differs from the first only in the completion of the circuit; the earth wires are "joined across direct from the insu-" lated reservoir through the galvanometer to the battery, instead " of being carried to earth plates, as usual."

In testing by electric tension or other well-known ways, " the " plan of the circuit will of course, quoad hoc, be correspondingly " altered in detail."

[Printed, 8d. Drawing.]

A.D. 1860, August 24.—N° 2046.

KERSHAW, George.—" Improvements in the construction of " medico-electric surfaces."

The inventor adapts "to the surface of some waterproof or " other suitable non-conducting fabric metallic surfaces composed " of discs, pieces or plates of positive and negative metals, which " are to be made to overlap one the other, and are kept in metallic " contact. These discs, pieces, or plates may be disposed in a " line to form a metallic band, which is to be metallically con-" nected at its ends, and worn round an arm or leg affected by " paralysis or slight symtoms akin thereto; or the discs may be " arranged in the form of a circle, oval, or other circumscribing " figure on the cloth to which they are attached. The attachment " of the discs to the cloth may be by sewing, rivetting, or other-" wise, but in whatever way they are attached, the discs, pieces, " or plates of positive and negative metal must be in metallic " contact with each other, the zinc and the copper pieces (if these " metals are used) being applied alternately and made to lap the " one over the other in regular succession to make up the figure. " The medico-electric surfaces thus produced, when applied by " suitable bands or straps to the part affected will, by reason of " the moisture of the skin, be set in action and impart the local " stimulus required."

[Printed, 6d. Drawing.]

A.D. 1860, August 25.—N° 2047.

THOMSON, William, and JENKIN, Fleeming.—" Improve-" ments in the means of telegraphic communication."

The contacts used to send signals through submarine or un-derground lines are adjusted "in such a manner that the final " strength caused by each signal at the receiving end of the con-" ducting wire shall be constant or nearly constant;" it is also

provided "that during the interval of time separating succes-
" sive letters, words, or sentences, the current passing through
" the receiving end of the wire shall remain at the same constant
" strength." By these arrangements "an increase in the speed
" of signalling through submarine and underground wires" is obtained; also suspended line wires are, by means of this invention, worked "with great speed and regularity."

For the sake of clearness the improvements are divided into the following parts:—

1st. Making signals "through submarine or underground wires,
" by varying the duration of the contacts between the wire and
" the sources of electricity at the transmitting end; each signal
" is produced by two contacts" of different electric potentials.

2nd. "During the time for separating any two letters," the current at the receiving end of the line is maintained "at the
" constant final strength by one or more pairs of contacts," called
" space contacts."

3rd. "The transmitting end of the line during the pause sepa-
" rating any two letters, words, or sentences," is connected "with
" a third source of electricity, at a potential intermediate between
" those potentials used in connection with the first and second
" contacts."

4th. Signals are employed, "which are distinguished one from
" another by the direction in which the change of the received
" current from a given strength occurs."

5th. "A rotatory key" for sending the above-mentioned currents.
" The contacts are made of the desired length, when stops are
" simply touched in succession by the sending clerk." "Part of
" the mechanism revolves at an uniform speed, whilst other
" portions can be thrown into gear at will with the revolving
" system, and will continue to revolve for a definite time making
" the contacts required for the signal, which corresponds to the
" portion thrown into gear." The length of these contacts depends solely "on the speed of the revolving system, and on the
" shape of the parts used to make contact." This key "may be
" usefully employed on land lines," where the preceding improvements are not required.

6th. The preceding improvements "are also applicable in sub-
" marine or underground lines to those signals, which are dis-
" tinguished one from another by the amount of variation of the
" received current from a given strength."

7th. Employing for submarine or underground lines, "for the " purpose of obtaining a constant final strength of current at " the receiving end after each signal the method of signalling " described as the fourteenth part" of N° 329 (A.D. 1858).

A key for making Morse and other signals by this method contains arms attached by friction to a uniformly revolving shaft. The requisite contacts are made by the action of the said arms upon tappets and tumblers. The clerk, by means of stops, arrests the revolving arms according to the signal to be sent.

8th. Making the sequence of contacts required to carry out the 1st, 2nd, 3rd, 4th, and 6th improvements, "by preparing the " message in paper or by type, which passing through suitable " mechanical arrangements at a regulated speed, make the re- " quired contacts."

9th. "The paper is stamped with bosses of the required lengths " by means of an embossing key."

The 8th and 9th improvements may be used to make "the " sequence of contacts required for any of the usual methods of " signalling;" they are especially applicable to the 14th part of N° 329 (A.D. 1858).

10th. Instruments in which the depression of a stop "prints or " shows a symbol or letter;" "a sending arm and a receiving " disc or type wheel driven by friction at equal speeds" are employed. "When the sending arm is arrested by a stop the con- " tacts between the sending battery and the line are so modified " that the receiving disc or type wheel is stopped by the action of " an electro-magnetic detent, when the arm is allowed to resume " its motion the original contacts are re-established, and the " receiving disc or type wheel being released also resumes its " motion." This instrument may be used to carry out the 7th improvement.

11th. "An electro-magnetic detent." "A bar of soft iron is " supported inside two galvanometric coils, so as to be free to " move back and forwards along their axis between two stops." The electric current passes through the coils "in opposite direc- " tions round their common axis." The bar of soft iron is magnetized by a permanent horseshoe magnet, and the direction of motion of the said bar is determined by the direction of the current through the coils. This combination, in connection with contacts, may be used as a relay.

12th. The revolving portions of the telegraphic mechanism

herein described are maintained at a uniform speed "by a gover-"
" nor which applies a break."

In the first form of the "static reaction governor," the axial revolving shaft is a prolongation of the vertical driving shaft, but is hinged on to it; the governor ball is carried by an arm which is hinged on to the apex of the axial revolving shaft. A horizontal arm projects "from the axial shaft, the other end of which " presses against a fixed surface of revolution and produces the " required friction."

In the second form of the "static reaction governor," "a spring " is substituted for the action of gravity to restrain the centri- " fugal force of the revolving mass or masses."

In both these governors the application of the frictional reaction does not "affect the divergence of the revolving mass from " the axial shaft."

13th. A "spring and pallet governor." A catch projects from one or both balls of a "single or double ball governor," outward from the central shaft. "When the divergence of the ball or " balls exceeds a certain limit this catch comes in contact with a " series of fixed springs arranged in a circle round the axis of " the governor."

14th. A "chronometric governor." "In this governor break " power used to prevent the mechanism from passing a certain " speed is increased or diminished respectively during any devia- " tion of a mass from the axis round which it rotates greater or " less than one constant deviation." Either increase or decrease of speed revolves a wheel by means of a catch, and thus in the former case increases the brake power, in the latter case decreases it.

15th. A form of Daniell's constant battery. The two exciting liquids are connected by a syphon.

16th. "A portable Daniell's battery without porous cells." A series of porcelain pots or troughs are placed one above the other. A copper plate is bolted to the bottom of the inside of each; crystals of sulphate of copper, sawdust moistened with dilute sulphuric acid, and a zinc plate succeed each other in the trough in the above-mentioned order. The bolt, passing through the bottom of each trough, makes the electrical connections for intensity in a suitable manner.

17th. A "divider." "By this instrument a difference of " potentials is produced in two terminals equal to any definite

"part of the difference of potentials resulting from one or more "cells, and thus currents of various definite strengths are pro- "duced in any arc joining the two terminals." This instrument is used "to subdivide electro-motive force" in working the 7th improvement and other telegraphic combinations. The two poles of the battery are connected through a reversing key with a series of equal resistance coils in sequential order. An additional arc of considerable resistance is connected to one of the terminals of the battery and of the series of coils; the remaining end of the arc is connected to an insulated brass bar, that may be connected to any one of the coil terminals at pleasure by means of a sliding spring. The increase in the value of the current transmitted through the arc is in *direct* proportion to the increase in the number of coils included in the battery circuit.

[Printed, 2s. 4d. Drawings.]

A.D. 1860, August 25.—N° 2051.

WILKES, JOHN, WILKES, THOMAS, and WILKES, GILBERT. —The title of this invention is "A new and improved method of "manufacturing wire for electric telegraphs and for such other "uses as the same is or may be applicable to."

The inventors state:—"We take a hollow cylinder or tube of "copper or other metal or alloy of which the wire is to be made, "and we fill the said tube with three, four, or more wires of the "same metal or alloy; we then roll or draw down the said tube "and wires until the mass has acquired the requisite diameter. "The wires with which we fill the tube may either be cylindrical "in figure or be wedge-shaped, so as the better to fill up the "tube. The figure of the wires, is, however, of little importance, "as in the rolling or drawing process the said wires and the tube "become consolidated into a compact mass. Wire made ac- "cording to our invention is not so liable to loss of conducting "power when used for electric telegraphs as ordinary wire, for a "defect in or injury to one of the wires does not extend across "the compound wire, and little loss of conducting power results "from such defect or injury.

"In ordinary wire a defect or injury may extend across the wire "and result in a total loss of conducting power."

[Printed, 6d. Drawing.]

A.D. 1860, August 25.—N° 2056.

CHATTERTON, JOHN, and SMITH, WILLOUGHBY.—(*Provisional Protection only.*) The title of this invention is "Improve-" ments in the manufacture of telegraphic cables."

The inventors state:—" This invention has for its object " improvements in the manufacture of telegraphic cables. For " these purposes, in order that the gutta percha insulating coat-" ings should not be subjected to heat in the process of manufac-" turing a cable, as has heretofore been the case when applying hot " pitch, rosin, and other matters, together with or after the fibrous " materials and wire coatings have been applied around the gutta " percha coated wires. We apply oxides or carbonates of lead, " or other preparation of that or other metal combined with oil " or varnish, together with the fibrous materials used externally " of the insulating gutta percha coatings, whether wire be em-" ployed, as well as fibrous materials, to give strength to the " cable or not. For these purposes the fibrous materials used, " whether made up in the form of tape, yarn, cord, or otherwise, " is coated or saturated with the paint or composition above-" mentioned, and by preference in the act of applying such fibrous " materials, and whether such fibrous materials are wound spirally " around or laid longitudinally over the surfaces of the gutta " percha; and it is preferred to bind an uncoated tape exterior " of the saturated coatings of fibre, in order that the cable may " be at once coiled."

[Printed, 4*d*. No Drawings.]

A.D. 1860, August 27.—N° 2061.

ARROWSMITH, JOHN.—" New or improved sash iron for " conservatories and other structures made principally of glass, " and also for windows and skylights, and other like purposes." Telegraph posts is one of the other purposes to which this invention is applied; this application is not mentioned in the Provisional Specification.

The telegraph posts manufactured according to this invention are cruciform in cross section. One wrought-iron bar is rolled into the form of a girder with a bulging in the central line in which is a central recess; the extremities of the girder form the opposite arms of the cross, the intermediate arms being formed by " pieces

" or arms " of bar iron let into the said recess. The above-mentioned pieces or arms are of such a cross section that when they are inserted cold into the grooves of the red hot girder-shaped bar, the whole presents a symmetrical cross section; the method of shrinking the arms into their places by heat fastens the whole securely together.

The post may be either " fixed in a cast-iron base secured to a " block of stone," or the foot or support of the post may be made " by slitting up the centre of the iron to a certain height, and " then turning up the four sides at right angles to the post."

Arms for carrying the insulators in which the telegraph wires are supported may be fixed to the telegraph post by screws.

[Printed, 1s. 10d. Drawings.]

A.D. 1860, September 1.—N° 2116.

HARRISON, Charles Weightman.—" Improvements in " electric telegraphs."

This invention " relates to improved modes of constructing " electric telegraph lines, especially when intended for submarine " and subterranean communication."

1st. " A means for transmitting signals through lines of great " length." The telegraph line is constructed " in two or more " parts or sections, each of which is made to contain an induc- " tive helix or apparatus for generating a secondary current." Each section acts " as a complete circuit in itself," and induces a secondary current to act in the next section.

These " inductive batteries " are arranged in pairs, " by which " means telegraphic signals may be propagated in reverse direc- " tions." The requisite contacts are made by means of a moveable break-piece, which is attracted by one or more of the cores of the inductive coils.

The inductive apparatus preferred consists of primary and secondary helices and tubular soft iron cores, arranged either in the order, iron core, primary helix, secondary helix, primary helix, iron core, primary helix, secondary helix, primary helix, iron core, &c.; or in the order, " iron core, primary helix, secondary helix, " iron core, primary helix, secondary helix, &c." For intensity of electric action the secondary current is allowed to proceed through the secondary coils in one continuous length, but for quantity all the coil terminals of the same name are coupled up together and

connected with the circuit which is intended to receive the said quantity current.

The inductive apparatus is enclosed "in a case of metal, which "may form the whole or a portion of a terminal or earth plate." The Specification describes and the Drawings show "two induc-"tive batteries" near together in one outer case, surrounded with a thick coating of gutta percha; the telegraphic cable passes through the centre of the coils, and has the various connections suitably made inside the said case; the aperture at each end of the case is "securely stopped by a cone of india-rubber."

2nd. "A mode of dissipating the residual or Leyden jar charge "which attends the use of insulated submarine electric conductors." "Improved forms of construction" are given "to the conductor, "and insulating or protecting medium, by forming edges, angles, "or points in or upon them or any of them, in place of making "them smooth and round, as hitherto done."

3rd. "Preserving the outer or protecting wires of telegraph "cables from decay." They are surrounded "with fibrous ma-"terial saturated with a compound of india-rubber or gutta "percha or similar gum." The said compound consists of certain proportions of gutta percha or India-rubber, tar oil, resin, and bone or Dippel's oil.

[Printed, 10*d*. Drawing.]

A.D. 1860, September 5.—N° 2145.

VERGNES, Maurice.—"An improvement in the construction "of magnetic or electric helices."

This invention "consists in making a helix of a number of "independent wires, each of which has only length sufficient to "extend from the outside of the helix to the inside and back "again, and is so wound or coiled as not to cross itself, and in so "connecting or joining the several wires that the cross section of "the helix shall be increased as the distance from the battery or "length of the wire is increased, whereby a greatly increased "power obtained with a comparatively small quantity of wire."

The "helix" is made made up of a number of independent double spirals—one spiral starting from the outside, the other from the inside—superposed one upon the other. As the centre of the "helix" is approached, more and more of the independent wires are combined to form one conductor.

A method of forming an elongated helix, according to this invention, by means of metallic plates having on their surfaces thin guides, is described and shown.

Two iron plates are placed "upon the outside of the helix," "one on each side, which become magnetized inductively, and "thus increase the effective power of the helix."

[Printed, 8*d*. Drawing.]

A.D. 1860, September 7.—N° 2158.

NICOLL, Benjamin.—(*Provisional Protection only.*) The title of this invention is "An improved method of treating needles, "and needles used in sewing and other machines, applicable also "to those parts of such machines that hold the needles."

The inventor states:—"My invention is magnetizing all kinds "of sewing and other needles. Those used in machines for the "purpose of making them cling to the parts while being fastened, "and also to magnetize the parts of the machines that hold the "needles, so as to allow my invention to be used where the "needles are not magnetized.

"My invention will facilitate the adjustment of the needles by "preventing their slipping while being placed in their proper "position, thereby saving time, and preventing the breakage of "them through being improperly placed previous to the machine "being set in motion; and will also allow sewing and other "needles to be more easily threaded, by applying the invention "either to the needles or the holders for them."

[Printed, 4*d*. No Drawings.]

A.D. 1860, September 7.—N° 2166.

HAMILTON, John, junior.—"Improvements in sockets for "receiving the lower parts of the posts or uprights employed in "constructing electric telegraphs."

The method of constructing the sockets of telegraph posts set forth in N° 117 (A.D. 1856), does not sufficiently prevent the posts from sinking in the ground in soft soils.

According to this invention a disc of cast iron is attached "around such sockets near their upper ends." In the centre of the disc recesses are formed corresponding to certain projections or "snugs" on the exterior of the socket, "so that the disc may

" be slid down over the socket past the snugs, and by then " turning the disc partly round the disc may be prevented from " rising." The disc " is strengthened by a flange around its " outer edge projecting downwards, and also by a flange pro- " jecting downwards around the edge of the hole through the " centre of the disc, and by radial ribs connecting the two flanges " together; the flanges may, if preferred, be made to project " upwards or the disc may be otherwise strengthened. Two or " more discs may, if preferred, be connected at distances apart to " the socket."

[Printed, 6d. Drawing.]

A.D. 1860, September 7.—N° 2169.

SPRATT, JAMES.—" Improvements in electrical conductors " & their fittings." The " electrical conductors " referred to in this invention are lightning conductors.

1st. " Improvements in insulators for fixing or sustaining " lightning conductors." They consist of short glass cylinders, " having a passage through the axis for the lightning rod," and " a projecting shoulder " at one end. These cylinders are placed in a ring, the stem of which is screwed into the support; certain notches and projections on cylinder and ring tend to fix the cylinder in the ring.

2nd. " Alloys of metals used as the points of lightning rods." The alloy described contains English block tin, oxide of tin, antimony, bismuth, silver, platinum, and silex.

3rd. " Compound metal points for lightning conductors." They are formed " of different metals or alloys embedded one " within the other, arranging the most fusible on the outside, " and so on in succession, each metal terminating in a fine point." Auxiliary points may be used in addition to the centre spear or rod.

4th. " Flexible flat web lightning conductors." These are woven of metal wire, copper being the warp and zinc the weft of the conductor.

5th. Making the conducting rods of lightning conductors " in " the form of a cross (+) in their cross section, in which form a " small amount of metal presents a large surface, and also affords " great strength. The leaves or bars of this form of rod may be " either straight or in a spiral form."

[Printed, 8d. Drawing.]

A.D. 1860, September 11.—N° 2194.

DÉNÉCHAUD, JEAN, and CHAPA, JOSEPH.—"An electric "controller for indicating the relative position of trains on rail- "ways."

A miniature representation of the line of rails and of the trains upon it is placed on the trains or at the stations in electric communication; this model is made to indicate the relative positions of two trains exactly, by means of electro-magnetism.

Each of the two trains whose relative position is to be indicated to each other, or to an intermediate station, carries a galvanic battery and one of the above models or "controllers." "Each "controller is composed of two electro-magnets, in front of which "are plates of soft iron held upon one end of a jointed lever; the "other end is connected to an anchor catch, which works into "pegs upon a wheel keyed on the end of a threaded shaft. Each "electro-magnet has similar apparatuses connected with it. A "nut, free to travel by the turning of the shaft, is placed on each "shaft, and by means of a rod rising from each nut is joined to "and made to propel a small carriage upon rails supported at the "upper part of the apparatus, and behind the carriages is a scale "divided into miles or other distances. One carriage represents "the train to which it is fitted, and the other that which is "following it or travelling towards it."

The contacts necessary to send the electric current from one train to the other are made by means of a conductor "which "depends from the frame," and comes into contact at certain intervals with tappets fixed to "an insulated metal band placed "along the length of the railway."

[Printed, 8*d*. Drawing.]

A.D. 1860, September 15.—N° 2249.

BARNWELL, STEPHEN, and ROLLASON, ALEXANDER.— The title of this invention is "Improvements in combining and "mixing certain solutions of pyroxylene with animal, mineral, "and vegetable substances, by which its quality is altered in such "manner as to produce hard, resistent, adhesive, plastic, or "resilient compounds and articles unalterable in their nature "and varied in colour, which said compounds in a state of solution

"may also be advantageously employed as paints or varnish," and one of the purposes to which it is applied is "for coating "and insulating telegraph wires."

To manufacture the "pyroxylene" it is preferred to use, "in "place of cotton wool," "common rags of any description;" upon being submitted to the action of the nitro-sulphuric acid, the rags "do not become disintegrated as the cotton would," consequently the acids may, when they have acted chemically on the rags, "be drawn off free from any suspended pyroxylene." The partially exhausted acids are able to be used and re-used by restoring them to their original strength by the addition of very strong fresh acids to them. "This re-use and renewal may be "repeated as often as may be found desirable."

The solution of pyroxylene is employed "for coating and in-"sulating telegraph wires, whether such wires have been already "protected by covering of any kind, or upon the bare metal." For this purpose a sheet of material is formed "by repeated "coatings or layers of the compound in solution."

[Printed, 6d. No Drawings.]

A.D. 1860, September 28.—N° 2355.

BIRKBECK, George Henry (*a communication from Gabriel Perrin*).—(*Provisional protection only.*) "Improvements in electro-"magnetic apparatus."

"The arrangement of apparatus preferred according to this "invention consists of a series of cylindrical pieces of soft iron, "(which may be of other forms), placed a short distance apart, "and connected together by means of copper slotted links and set "screws capable of adjusting and varying the distance apart of "the cylinders or other forms of soft iron. The series of cylinders "is placed in the interior of a coil of an electro-magnet, and the "barrel on which the coil is wound is of such a size that the "cylinders of soft iron and their connections can pass into the "interior of its circumference without touching, rods of non-"conducting material being employed to retain the parts in "position; apparatus thus arranged furnished with apparatus "of attraction is applicable to electro-magnets of every form, and "may have two arms straight or of other form, and a suitable "armature or armatures adapted thereto. By this arrangement

"an indefinite number of pieces of soft iron may be connected "and a current obtained as long as desired, the power of attraction "increasing with the length of the cylinders so connected."

[Printed, 4d. No Drawings.]

A.D. 1860, October 2.—N° 2383.

BONELLI, Gaetano.—(*Provisional Protection only.*) "Improved apparatus for transmitting telegraphic despatches."

The object of this invention is to produce "by electro-chemical "agency the telegrams on paper ready for transmission to the "person addressed without the necessity of taking down the "despatch from signs or signals as is now generally the case."

The electric conductor at the first station is passed over the written or printed despatch in a straight line, and the said despatch is reproduced at the other station on chemically prepared paper by the alternate breaking and making the electric circuit as the conductor is drawn across the metallized paper on which the despatch is written in insulating ink. The conductor drawn over the writing is "composed of a number of fine wires insulated and "arranged, or combined together in the form of a broad brush "or comb, so that by passing this brush or comb over the writing, "the whole depth of the line will be reproduced at once, instead "of it being necessary to pass the electric current to and fro "several times." These conducting wires are arranged "in the "form of a cable or rope, which may be buried in the earth," or if preferred, the conducting wires of the brush "may be connected "with the same number of wires extended from post to post along "the line of transmission as is now the case." Instead of using metallized paper and insulating ink, the despatch may be set up "in ordinary typographical characters."

"Another part of the invention consists in preparing the paper "with a chemical solution, upon which the current of induction "will not interfere with the proper action of the electric current "on the chemically prepared paper."

[Printed, 4d. No Drawings.]

A.D. 1860, October 9.—N° 2457.

BONELLI, Gaetano.—"Improvements in electric conductors "and apparatus for transmitting telegraphic despatches."

1st. Electric conductors. A number of metallic wires, insulated or not, are arranged, in connection with threads of fibrous material,

as the warp of a woven fabric. The resulting fabric is coated with insulating material and the whole is rolled up into the form of a cable. The wires are secured in this form by a single or double binding of twine. An exterior coating of pitch or tar is given to the cable.

2nd. Transmitting signals. The points of a number of insulated conducting wires are arranged like the teeth of a comb, and are drawn over typographical characters, thus completing at one operation the electric circuits necessary to form the signals at the receiving station.

3rd. Receiving signals. The electrolysis of a chemically-prepared paper is the means of recording the signals. The solution used to prepare the paper may either contain ferro-cyanide and ferrid-cyanide of potassium together with distilled water and acetic acid, or "nitrate of ammonia and yellow cyanide of iron and "potassium." Instead of using chemically-prepared paper, pointed instruments may be made to act on transferring paper by means of electro-magnets.

A telegraphic system, according to this invention, in which the above improvements are combined, is set forth. The transmitting and receiving instrument consists of a carriage (on which "combs" are mounted) that is released by means of an electro-magnet, and carried forward uniformly by clockwork driven by a weight. The combs are thus made to traverse type and prepared paper respectively, and signals are simultaneously sent and received.

[Printed, 1s. 2d. Drawings.]

A.D. 1860, October 10.—N° 2462.

WHEATSTONE, Charles.—"Improvements in electro-magnetic telegraphs and apparatus for transmitting signs or indications to distant places by means of electricity, and in the means of and apparatus for establishing electric telegraphic communication between distant places."

1st. A modification of the 6th improvement of N° 1241 (A.D. 1858). "The magneto-electric machine is dispensed with, "and an apparatus similar to that described as part of the fourth "improvement of the same Patent is connected with the axis, "which carries the index for the purpose of alternating the direction of the currents proceeding from a voltaic battery placed in "the circuit, the axis carrying the index is caused to rotate and

" the apparatus producing the inversion of the current is brought " into play by a motion communicated to the axis by means of " appropriate gearing from a winch moved by the hand or from " any maintaining power." Secondary or induction currents may be "communicated to the telegraphic circuit" by means of this apparatus.

According to one form of apparatus, a current-changing wheel takes the place " of the driving wheel on the axis for moving the " armature of the magnet."

In a second form of apparatus, a vertical axis completes the requisite circuits by means of the pressing contact of springs. A revolving disc, having links attached to its circumference, causes the springs to press alternately against the proper binding screws.

2nd. A voltaic communicator. In this instrument the number of alternately inverted currents necessary for each signal is solely determined by the pressure of a finger stop. "The finger stops " or keys are circularly arranged round a central axis carrying on " its upper end an index, which, as the axis rotates points to " different characters on a letter circle." A portion of the axis may consist of an endless screw, upon which levers may act to rotate it, the depression of a finger key being allowed to work one of several levers; a pin upon the finger key arrests the rotation of the axis when all the requisite currents have passed. " Instead " of a screw the axis may carry a pinion with ratchet leaves, " which is caused to rotate by any one of several racks in gear " with the pinion." This instrument may be adapted to "simply " interrupted" or to induction currents.

3rd. Magneto-electric machines. In a machine with a single soft iron armature—a simple magneto-electric machine—the said armature " revolves before a horseshoe, or other magnet with " bifurcated poles, made either of iron or steel, and round which " poles insulated wire is wound." An axis passing through the centre of the circle, on the circumference of which the coiled poles are mounted, " carries a soft iron armature, the breadth of which " is a little greater than the distance between two adjacent cores." By this construction "the alternate currents are caused to succeed " each other with equal intensity, and at regular intervals." In a machine with a number of armatures—a compound magneto-electric machine—" the magnets are placed so that the axis" [axes?] " carrying the armatures are vertical, and arranged at " equal distances in a circle; each of these axis" [axes?] " is

" furnished with a pinion, and all the pinions gear into a wheel " fixed on an axis, which is connected by means of multiplying " wheels with the handle. The position of the armatures may be " so varied that the shocks produced by all the magnets may be " simultaneous, or they may be successive."

4th. " Substituting far a voltaic battery a magneto-electric " machine, either simple or compound," " kept in continual " motion by the action of a constant force, for the purpose of " ringing any number of electro-magnetic bells anywhere placed " in an establishment." Each bell and its finger-key has a separate circuit, and the magneto-electric current passes only through that particular bell whose finger-key is depressed at any one time. A compound magneto-electric machine, employed for the above purpose, is described and shown, in which the coiled soft-iron cores affixed to the permanent magnets are stationary, and a " central axis carrying the armatures revolves."

5th. Magneto-electric apparatus for ringing electro-magnetic bells. For this purpose several successive shocks are produced by " a single motion of a lever." " The lever is connected with the " rotating armature of the magneto-electric machine, by means of " a chain or band, which causes it to make several revolutions by " a single motion of the lever, and a spring reverses the motion " immediately the armature ceases to act."

6th. Telephones in which "musical pipes or free tongues" are acted upon by wind. Compressed air or gas is admitted to the pipe by means of a valve acted upon by the magnetized needle of an electro-magnet. " The alternation of long and short sounds" may be " grouped in a similar manner to the long and short lines " in the alphabet of a Morse's telegraph." By using two pipes whose valves are respectively acted upon by opposite electric currents, two sounds may be " made to succeed in the order of the " alternate motions which constitute the alphabet of a single " needle telegraph."

7th. A modification of the transmitter described as the 2nd improvement of N° 1239 (A.D. 1858), " so as to enable it to act upon " the receiver of a Morse's telegraph, in order to impress or " print the long and short lines, the various groupings of which " constitute an alphabet." " The contacts made by the external " wires of the rocking frame are so disposed, that whether one or " the other be depressed, the current is transmitted to the tele- " graphic wire in the same direction, instead of in opposite direc-

" tions, as in the case of the former construction. The eccentric " which effects the elevation and depression of the wires acts " differently upon them, so that the duration of the contact of " one wire lasts longer than that of the other."

8th. " A telegraphic thermometer, which communicates to a dis- " tant place notice of the two limits of its indications." The free end of a straight compound metallic bar is so placed that, if the temperature to which it is subjected reach either a given maximum limit or a given minimum limit, the consequent curvature of the bar completes an electric circuit, which includes " a voltaic " battery and an electro-magnetic bell." The contact pieces corresponding to the two values are mounted upon two arms that are capable of movement on a centre over a graduated arc; the said arms can thus be set to any desired temperature.

" Instead of a straight bar, a compound bar formed into a " helix, as in Breguet's metallic thermometer, and carrying at its " unfixed end a pointer may be substituted, pins moveable for " the purpose of being set at determinate degrees are placed on " the graduated circle, and the contact of the pointer with either " of these pins determines the completion of the circuit."

9th. A system of establishing over-house telegraph lines. " A " rope containing several insulated wires " is not subjected " to " any stretching force," but is suspended from wires stretched " between supports placed at suitable distances." The ropes are arranged over a town in a species of triangulation, " by which " several ropes abut on each straining post, and extend from one " straining post to another without the necessity of crossing each " other." At each stretching post the wires of the ropes abutting on that post are conveyed to a connecting box; uninterrupted communication in several ways is thus formed " from any one " point to another in the system." Supporting posts may be placed at points intermediate to the positions of the straining posts, and connecting discs may be placed on these supporting posts to supply branches to adjacent stations, or for testing purposes.

A modification of the above plan consists in " suspending the " rope containing the insulated wires over streets in the direction " of their length, from transverse rods or wires fixed to houses " opposite each other."

Instead of using supporting wires, the telegraph rope may contain a central wire, " composed of one or more strands of iron,

" steel, or other suitable metal, for the purpose of being stretched " between supports placed at suitable distances."

10th. " Interposing a cylinder of vulcanized India-rubber be- " tween the support and the insulating apparatus of the tele- " graphic wires," in order to prevent " the communication of " sound and vibratory motions arising from the action of wind."

11th. In order to augment the shocks of a magneto-electric machine, short-circuiting its current " the instant after the shock " is thrown open into the telegraphic circuit without breaking " the continuity of the latter." There is no 11th improvement in the Provisional Specification.

[Printed, 2s. 4d. Drawings.]

A.D. 1860, October 17.—N° 2534.

McCRUM, ROBERT GARMANY.—" Improvements in machinery " or apparatus for preparing 'cards' for jacquard machines."

The punches in a card-punching machine are selected by means of electro-magnets in combination with "a suitably " prepared pattern surface and jacquard."

The punching machine consists of a shaft carrying a series of cams, which (by means of levers, cords, and counterbalance weights) work the jacquard apparatus, lock the punches in the punch box, and perforate a card, by forcing those punches that project from the punch box at any one revolution of the shaft through the card that is then on the punching plate. This series of operations occurs in the above-mentioned order at each revolution of the cam shaft.

In the jacquard arrangement a griff-board is employed instead of a griff-frame, " cords with knots are used in lieu of wire " hooks," and the needles are acted upon by electro-magnets that are moved up to them at each revolution of the cam shaft. Each punch has a corresponding weighted cord, needle, electro-magnet, and tracer, and the number and position of the punches obtruded from the punch box at any one time depends upon the number and position of the tracers through which the electric current is then permitted to pass by the partly varnished pattern. The electric current passes from the positive battery pole to the metal foil pattern surface, round those electro-magnets whose tracers are in absolute contact with the metal foil, to the negative pole.

Two other ordinary jacquard arrangements are used in conjunction with the above apparatus when cards of twilled patterns are to be punched.

[Printed, 1s. 4d. Drawings.]

A.D. 1860, October 18.—N° 2546.

WESOLOWSKI, MAURICE (*partly a communication from Johann Nepomuck Reithoffer*).—(*Provisional Protection only.*) "Improvements in the obtaining of light, and in the apparatus "employed therein."

"This invention relates to a peculiar system or mode of "obtaining an instantaneous light suitable for lighting a candle, "for example, without the aid of matches, and consists in the "employment of a small frictional electric machine; the disc or "cylinder of the machine may be composed of glass, hard india-"rubber, or other material." "The frictional rubber or pad is "composed of cloth or suitable material, and is supplied with a "peculiar amalgam," "this amalgam consisting of one part "by weight of spelter or zinc, one part of tin, and one-half part "of quicksilver." "The current of electricity generated by the "machine is conducted to a vessel containing a mixture of sul-"phuric alcohol and etheric oil, or other equally inflammable "fluid, this vessel being insulated. A cotton or other wick in "this liquid is in connection with a wood or other suitable "electrode carried by the cover of the vessel. Above the end of "the electrode is a metal wire or negative, for the purpose of "obtaining the electric spark when the machine is operated. In "using this apparatus for the obtainment of an instantaneous "light, it is simply necessary to impart a sharp turn to the disc "or cylinder of the electric machine, whereupon the current "generated thereby is conducted by a suitable conductor through "the metal of the vessel, and is discharged from the metal socket "which contains the electrode. This electrode being submitted "with the alcoholic sulphur and etheric spirit, is instantly ignited "by the action of the electric spark, and remains ignited as long "as is required for obtaining a light for a taper or lamp."

[Printed, 4d. No Drawings.]

A.D. 1860, October 18.—N° 2548.

ANDREWS, WILLIAM.—"Improvements in insulators for "telegraph wires."

The cross arms or bars (of the telegraph post) that support the insulators are bored with holes, one hole to each insulator. Insulators of vulcanite or porcelain, having "bolts" and covers joined to them by cement, are fastened into these holes; by this arrangement "the insulator is enclosed, hermetically sealed at "top, and perfectly protected all round by a comparatively good "insulating substance. The strain is borne by the mass of the "arm."

The "bolt" for the reception of the telegraph wire has a head at its upper extremity and a hook or scroll at its lower end to support the wire. The head of the "bolt" is imbedded in the upper and wider part of the hollow insulator by means of marine glue, and the vulcanite or porcelain cap or cover is fixed over this composite insulator, either by means of a screw or by cement. The shoulder of the wider part of the insulator drops on to a projecting ring in the hole of the arm, and is fastened in that position by marine glue.

"The bottom part of the bar is" "grooved out lengthways in "a half circle," and the whole bar is covered with a coating impervious to moisture.

In one arrangement the bolt and insulator rest upon vulcanized India-rubber rings.

In a modification of this insulator, not suitable for resisting great strains, the insulator and cap are in one piece, and the "bolt" is fastened by cement only.

Other details are set forth.

[Printed, 8*d*. Drawing.]

A.D. 1860, October 24.—N° 2587.

WALENN, WILLIAM HENRY.—(*Provisional Protection only.*) "Improvements in magneto-electric machines, and in electro-"magnetic engines."

1st. Magneto-electric machines.—In these machines continuous currents of electricity are produced direct from the helices without the use of commutators. As the polarity of the induced magnets never alters in intensity, nor is never changed, the mechanical power necessary to move the helices is small. Six methods of accomplishing this result are set forth; in all these methods "either the coils rotate round their own axes, or else the per-"manent magnets rotate round axes which are identical with or

" concentric to the axes of the coils." "An improved method " of conducting away the current (for use)" from a coil that rotates on its own axis "is to construct its core in two halves in- " sulated from each other, each half being in metallic contact " with one end of the wire; by this means the current is con- " ducted down the uprights or supports of the centres of rotation " to binding screws suitably placed in electric connection with " them."

2nd. Electro-magnetic engines.—" All the herein-before men- " tioned methods are adapted for use in electro-magnetic engines " by simply transmitting a suitable electric or galvanic current " through the coils, and causing them to produce mechanical " motion as a result, instead of using the mechanical motion of " the coils or magnets and causing them to produce electricity as " a result."

" In all the above methods electro-magnets may be used " instead of permanent magnets."

[Printed, 4*d*. No Drawings.]

A.D. 1860, October 27.—N° 2629.

MANN, WILLIAM.—(*Provisional Protection only.*) "A method " of indicating at a distance the revolutions of shafts, spindles, " and axles."

In indicating the number of revolutions performed by the spindle of a gas meter, for instance, the button or "drum" on one end of the spindle is formed "of wood, bone, or other non- " conducting substance," and it has a strip of platinum let into it or fixed on it. One wire from a galvanic battery communicates with the "drum;" the other wire also communicates with the drum, but only when the strip of platinum causes it to do so. The indicator consists of "an ordinary index or gas counter pro- " vided with a lever, in connection with a star click or other like " wheel, which acts on the train of wheels in the counter." Over the lever is fitted "a soft iron bar or rod surrounded by a coil in " connection with the wire leading from the meter to the battery. " The action is as follows :—Every time the spindle revolves the " circuit is established by the platinum on the drum, the soft iron " bar or rod over the counter is magnetised and draws up the " lever, which forces the star or other like wheel connected with " it to move one step, which is registered on the index. As soon

" as the circuit is broken by the moving round of the drum, the " bar or rod is demagnetised, drops the lever, and the operations " are repeated as before."

[Printed, 4d. No Drawings.]

A.D. 1860, October 31.—N° 2660.

BULL, William.—" Improvements in the permanent way of " railways, and in connection therewith."

This invention " consists in certain new forms of rails, chairs, " and fastenings, and modes of framing and laying the sleepers, " whereby the transverse and longitudinal bearing principles are " combined, the stability and safety of the road are increased, and " the rails are made available as *electric conductors*, so that the " progressive motion of any train thereon can be indicated thereby " at any station, or to any following or preceding train on the " same line."

At suitable distances "the metals between two or more" of the sleeper frames are insulated " by cutting off contact and connec- " tion at the joints thereon. The sections of the rails and metals " thus insulated are to be connected with line (electric conducting) " wires. A suitable apparatus attached to the train, and in con- " nection with the wheels, would establish electric communication " for telegraphing or signalling between such train and the sta- " tions on the line, and also between or with the preceding and " following trains."

The indicator is a graduated dial representing miles and quarters of a mile. "Upon a spindle in the axis of this dial there is an " escape wheel and a hand or pointer; this wheel being relieved " one notch by the action of the electric current as the train " passes the quarter distances, also moves the pointer through a " corresponding distance on the dial, and thus indicates and " registers the progressive motion of the trains."

When the line of rails is under repair, an arm upon the engine makes contact with a wire suspended between two small pillars that are screwed into the sleepers.

A needle indicator and station signal apparatus are alluded to.

[Printed, 10d. Drawing.]

A.D. 1860, October 31.—N° 2661.

GHISLIN, Thomas Goulston.—(*Provisional Protection only.*) "Preparing, applying, and adapting certain articles of vegetable

" production called eiklonia buccinalis, proteaceæ, juncus serra-" tus, juncus trista, and amaryllideæ, to further new purposes of " manufacture."

Certain applications and adaptations of the eiklonia buccinalis, the proteaceæ, and the juncus trista are set forth.

" The forth and fifth articles are fibrous bulbs, viz., Josephina " berglilly, etc. (the amarillydeæ family) and a fibrous acquatic, " known by botanists as the juncus serratus, or grass tree. The " fibre of these plants I use separately or mix with others fibres, " as the case may be, and apply then" [them?] "*for the purpose* " *of insulating electric wires*, and for coating and manufacturing " electric, submarine, and other cables. I apply in conjunction " with these fibres a solution composed of zopissa, marine glue, " Trinidad pitch, Egyptian asphalte, and Judean gum."

N° 1049 (A.D. 1857) is referred to in this Provisional Specification.

[Printed, 4d. No Drawings.]

A.D. 1860, November 1.—N° 2674.

NEWTON, William Edward (*a communication from Messieurs Claes, Vanden Nest, & Co*).— "An improved mode of " preparing or insulating electric conductors, for telegraphic " purposes either on land or under water."

" The electric wire is covered with a combined fabric consisting " of silk, linen, cotton or other filamentous substance attached " together by caoutchouc or other analogous gums which are to " be submitted to vulcanization either wet or dry. The fabric is " covered on both sides with a solution of caoutchouc prepared " for vulcanization, and this is again covered with a layer of " caoutchouc mixed with the substances ordinarily used in vul-" canizing. The telegraphic wires are to be previously tinned to " protect them from the sulphur, and any suitable number may " be twisted together in the form of a cable. In order to prevent " the formation of air bubbles the wires after being twisted are " passed through a bath composed of a solution of caoutchouc in " naphtha mixed with calcined magnesia, oxide of zinc, white lead, " silicate of magnesia or French chalk, sulphur, and such other " materials as are usually employed in vulcanizing. If desired " this bath may be contained in an air tight case or chamber from " which the air has been exhausted."

"On being removed from the bath the telegraphic conductors "are passed over" a heated table. Four or more helical or other coverings with textile material and immersions in the bath are given to the wire.

Instead of tinning the conducting wires they may "be covered "by means of electro-deposition with aluminium, or with a coating "of gold."

[Printed, 4d. No Drawings.]

A.D. 1860, November 1.—Nº 2678.

MURRAY, Robert.—(*Provisional Protection only.*) "Im-"provements in the manufacture of telegraph cables or ropes."

"This invention has for its object improvements in the manu-"facture of telegraph cables or ropes, and consists in the employ-"ment of galvanic batteries, or it may be of magneto-electric "apparatus, with the machinery employed in laying or manufac-"turing electric telegraph ropes, or cables, containing insulated "electric conductors, in such manner that the insulated con-"ductors may be tested as the process of laying or manufacturing "goes on by electric currents being passed through such electric "conductors at each revolution of the machinery, (or of any of "the parts of the machinery revolving on their own axes) by "alternately making and breaking contact between the electric "conductors and the batteries, or the magneto-electric apparatus "employed, such currents of electricity being indicated by a "galvanometer or other suitable instrument at the end of the "cable or rope."

[Printed, 4d. No Drawings.]

A.D. 1860, November 12.—Nº 2770.

WALTON, Frederick.—"Improvements in insulating tele-"graphic conductors."

The material employed for this purpose is "obtained from "linseed and other drying oils by oxidizing the same," as is described in Nº 209 (A.D. 1860). The oxidised oil is partially dissolved by heated spirits of turpentine, "and in this state the "compound is used for coating electric telegraph wires or con-"ductors in like manner to that in which gutta percha and other "insulating materials have been employed for insulating such "conductors."

The inventor, however, prefers to use the oxidised oil "in com-
" bination with shellac or with other resin or gums." "The com-
" pounds are produced by employing volatile solvents such as
" spirits of turpentine, or others by which, with the assistance of
" heat, the shellac or other resin or gum is first rendered plastic,
" and the prepared oil is then mixed therewith by a masticating
" or other suitable machine or mixer, or part of the solvent may
" be first mixed with the prepared oil. One or more coatings of
" the compound is applied to the wire or other conductor of elec-
" tric telegraphs, as has heretofore been done when coating with
" gutta percha or other insulating material or compounds."

[Printed, 4d. No Drawings.]

A.D. 1860, November 16.—N° 2820.

WELTON, THOMAS, and MONCKTON, EDWARD HENRY CRADOCK.—" Improvements in the application of electricity or " magnetism to the human body for the relief of pain and cure " of disease."

" We place the armature or medium of completing the the
" magnetic or electric current at the back of the part of the body
" affected, both body and armature being insulated from the
" ground by the interposition of glass or any other non-conduct-
" ing medium, such as forming the back of a chair or any or
" various parts of a couch or bed of metal, insulated by glass legs
" or otherwise as may be required, or on a wall, the body being
" similarly insulated and interposed or placed between the arma-
" ture and the magnet or battery, thus the magnetic current
" passes through the body or part affected before completing the
" circuit. The armature may be composed of metallic plates,
" bars, blocks, chains, wires, or rings united in any convenient
" manner. The strength of the current may be graduated by
" varying the distance of the magnet or magnets or armature
" from the body, or by using a more or less powerful magnet or
" magnets, or battery or batteries, or both, or by interposing
" any substance or covering between either the armature or
" magnet and the part of the body to be acted on, one great ad-
" vantage of this mode of applying magnetism or electricity being
" that in no case is a shock felt to the human system however
" intensely the magnetic power may be applied, the only sensa-

" tions produced being those of an occasional slight tingling and " a slight glow or warmth in the parts effected."

[Printed, 4d. No Drawings.]

A.D. 1860, November 20.—N° 2843.

HAMILTON, John, junior.—"Improvements in tubular " wrought-iron telegraph posts."

" This invention has for its object the strengthening of iron " telegraph posts made in the form of tubes by inserting wrought " or cast iron hoops into the internal part of such tubes at such " distances as may be deemed desirable; and according to the " strength required the wrought or cast iron hoops may vary in " width, and be rivetted, welded, or braised, and of any thick- " ness. When the tubes taper, these hoops may be made with a " corresponding taper to the part at which it is desired to place " the hoop, or as an internal stay, where they will wedge them- " selves; the hoop may also be rivetted to the tube or held by " the two being galvanized together."

" The tubular post shewn in the Drawing is composed of sheet " metal bent into a tubular form and rivetted up into a tube; " but the tube may be otherwise formed." " The rings are by " preference forced into their positions in the tube by means of " a ram or forcer worked by power, the ram entering the tube and " forcing the rings into their proper position."

[Printed, 6d. Drawing.]

A.D. 1860, November 22.—N° 2858.

VARLEY, Samuel Alfred, and VARLEY, Cromwell Fleetwood.—" Improvements in the regulation of heat, parts " of the invention being applicable to other purposes." Some of the improvements involve the use of electric force.

In the apparatus—called "thermo-regulators"—described in the Specification and shown in the Drawings, the heat is regulated by the pressure of a fluid in a "bulb" upon mercury in a syphon tube.

In one instance electric currents are employed in conjunction with the "thermo-regulator," to "give signals to a distance, indi- " cating that the temperature is either too low, right, or too " high." Springs, connected with electric circuits, are fixed in

a wooden slide that is adjustable, by means of guide pieces, in any required position in the above-mentioned syphon tube, so that the non-conducting pin of a platinum float completes the circuits, or prevents their completion, according to its position in the tube. "The electric current is sometimes used to work a "damper or sound an alarum." A galvanometer is included in the circuit when the temperature is too low, but when the temperature is too high another galvanometer indicates the fact, and an electro-magnet applies a damper to the fire.

The conductors used in these galvanometers and electro-magnets consist of a ribbon with wires for the warp and silk for the weft threads; two of these ribbons are equal in width to the height of the coil. The ribbon is placed across the coil and wrapped in opposite directions.

The cores of the electro-magnets are made of "electrotyped" [electro-deposited ?] iron.

The magnetized needles are made "of a series of parallel bars "laid side by side and soldered together."

[Printed, 1s. Drawing.]

A.D. 1860, November 22.—N° 2862.

JOBSON, ROBERT.—"Improvements in moulding articles of "earthenware or porcelain, and in apparatus used therein." The apparatus for moulding electric telegraph insulators is shown in the Drawings and described in detail in the Specification.

In making a plunger for manufacturing hollow articles, instead of making the said plunger in one piece of metal, it may be made in two parts, consisting of two or of several pieces. The interior or body of the plunger "is made conical," and a split ring fits over it; in withdrawing this compound plunger from the mould, "the ring by a suitable contrivance is held down while the body "is partly withdrawn;" the ring "is then easily withdrawn "without injury." Instead of employing a spring ring, it may be made in several parts that are capable of moving inwards.

In telegraphic insulators, in which an inner cup springs from the bottom of the outer cup, the portion of the plunger that moulds the inner cup is retained in the mould, while the body of the plunger is withdrawn.

In the manufacture of some kinds of telegraphic insulators, the plunger is made in concentric parts that are capable of sliding on or in each other, so that the interior of the article is finished by a

succession of blows. According to this plan the insulator is held down in the mould by some parts of the plunger while other parts are removed.

The ram of the fly press may be made distinct from the plunger, so that the said plunger "or inner die may receive a succession of "blows without being raised out of the mould." The concentric parts of the inner die may be composed of two or more pieces.

[Printed, 10*d*. Drawings.]

A.D. 1860, November 23.—N° 2871.

KEIRBY, EDWARD.—(*Provisional Protection only.*) "Improvements in covering, insulating, and preserving telegraphic wires "and cables."

"This invention consists in covering such wires and cables "with yarn of hemp, tow, flax, or other fibrous substance "saturated in a mixture of native asphaltum or coal-tar pitch and "gas tar, or other oily substance, by which they are insulated "and preserved from decay."

[Printed, 4*d*. No Drawings.]

A.D. 1860, December 3.—N° 2957.

PIGGOTT, WILLIAM PETER.—"Improvements in the mode of "generating electric currents, manufacturing submarine telegraph "cables, & the mode of transmitting signals."

The Provisional Specification states this invention to consist of "the manufacture of a cable," in which the core (of two or more wires) is surrounded with tarred hemp and the outer coating consists of iron wire. The electric currents are generated and the signals given by bringing either end of the inner wires into contact with the outer wires of the cable.

The Final Specification sets forth that the invention consists of a "method of giving a static charge to a cable," and the construction of certain "generators."

"A copper or other wire circuit" is made "in the cable," and the instrument is placed "in such circuit at the distant station;" the strands of hemp that surround the wires of this circuit are saturated with chloride of calcium and then passed through powdered lime. The "static condition" of this cable is produced by means of a covering of metal wire "of a different electric pro-

perty "from the above-mentioned wire circuit. A small battery has one pole connected with "the inner circuit of the cable" and signals are transmitted by contacts of the other battery pole with " the other element of the cable."

A "ganglionic cable" consists of a single conducting wire, whose ends are brought "to earth plates, as in the ordinary " method," but which has a series of "generators" "along the " whole line of cable, and at such distances as will keep the line " statically charged."

A generator consists of a cylindrical insulated case containing dissimilar metal plates separated by calcareous earth well ground with a solution of a "chlorine salt."

[Printed, 8*d*. Drawing.]

A.D. 1860, December 4.—N° 2980.

DUNCAN, Charles Stewart.—" Improvements in the con- " struction of electric telegraph cables or ropes."

" In the first instance I cover the centre wire or wires with " strips of cane (bamboo or ratan), which I bind in a spiral form, " with or without unspun silk, or any other suitable cane or " woods, the same being well tanned with a preparation of oak " bark, terra japonica, mammosa, or sea-squill tan, or any other " known tanning agent. The whole is then to be covered with " a thin coat of gutta percha, india-rubber, or marine glue, either " separately or combined, for the purpose of filling up the inter- " stices between the coils; these coils or bindings may be re- " peated as many times as may be deemed desirable for the " purpose of strength or preservation of the wire from external " moisture or injury, care being taken to cover each coil of cane " with a layer of any of the above materials, after which the entire " cable or rope is covered with yarn, hemp, or shavings of any " wood, and finally bound with strands of copper or other wire; " or strands of rope composed of hemp, separately or in combina- " tion with copper or any other wire. By this means it will appear " evident that great strength and flexibility are obtained with " very little weight, as well as a more perfect insulation of the " interior wire, these being great desiderata in electric telegraph " cables or ropes."

[Printed, 4*d*. No Drawings.]

A.D. 1860, December 5.—N° 2982.

SIEMENS, CHARLES WILLIAM.—"Improvements in fluid "meters." One part of this invention relates to certain applications of electric force.

The invention, as a whole, "has reference to the class of high-"pressure fluid meters acting by impact of water upon rotating "wheels with helical, spiral, or other blades or projections, or by "reaction in issuing from orifices at the circumference of a "rotating wheel." N° 14,060 (Old Law), N° 712 (A.D. 1853), and N° 2824 (A.D. 1856), relate to meters of this class.

A portion of this invention refers "to measuring the velocity "of a vessel through the water, or the velocity of the water in an "open stream." Instead of having a mechanical connection between the measuring apparatus or log and the recording apparatus, an electric current is used. The measuring drum is suspended in the water by lines or rods, and a portion of its axis, that is in a close chamber, carries an eccentric. At every revolution of the drum the eccentric completes an electric circuit, and "an electric "current flows through metallic coils forming part of the re-"ceiving instrument, and causes the movement of an armature, "which acts upon a ratchet wheel or other clockwork arrange-"ment causing the hand upon the dial of the instrument to "move a step." In the Drawing the cam is not fixed upon the drum axis, but upon an axis connected therewith by screw-wheel and spur-wheel gear; also one cam is used to make and another to break contact, each cam acting upon its own spring.

[Printed, 1s. Drawing.]

A.D. 1860, December 6.—N° 2991.

GLASS, RICHARD ATWOOD.—(*Provisional Protection only.*) "A "method of and apparatus for preserving electric telegraph "cables and wires, prior to their being laid."

The inventor states:—"My invention consists in enclosing the "cables or wires in air-tight boxes or cases, and in the employ-"ment of boxes or cases with jackets or double sides at every "part, into which cool air, or water, ice, or cooling mixtures may "be pumped or introduced, or which may be packed with any "suitable non-conducting material.

" My invention further consists, in some cases, in placing the " cables or wires in tanks or cases, and in filling up the same with " water or other suitable liquid, after which a cover is applied. " These tanks or cases may or may not be formed double sided " according to the first part of my invention."

[Printed, 4d. No Drawings.]

A.D. 1860, December 12.—N° 3047.

JALOUREAU, ALFRED FAUVIN.—" Improvements in means " or processes for holding, protecting, and insulating subterra- " neous telegraph wires."

This invention consists in stretching the telegraph wires in tubes of bituminized paper, introducing hot bitumen therein, and joining the said wires and tubes so as to form a continuous and well insulated telegraph line. The bituminized paper tubes are described in N° 2137 (A.D. 1858).

" On or in the surface of a flat table is fixed a slightly conical " block or plug of cast iron; over this is placed a ring or short " tube of glass having as many grooves on its exterior as the " number of wires to be insulated." A bituminized paper tube " is placed over and so as to enclose the aforesaid glass tube or " ferule. If the bituminized paper is sufficiently long a similar " glass ferule is placed on the top of it, but if not two or more " tubes are placed one over the other with a sort of double inter- " mediate glass ferule. The wires are laid in the grooves in the " glass ferules and stretched tight." The tubes are then filled with melted bitumen, which, whilst still soft, is compressed into all parts of the tube by a temporary plug. The pipes are joined in the trenches by means of a ring or disc fitted into the adjoining ends of two pipes; " this disc has grooves to receive the wires " which are joined by twisting them together or otherwise. This " disc is then surrounded with bitumen, and if necessary a joint " may be covered with bitumenised cloth or paper wound round " it."

[Printed, 8d. Drawing.]

A.D. 1860, December 14.—N° 3077.

CLARK, WILLIAM (*a communication from M. André Louis Hyacinthe de Goy*).—(*Provisional Protection only.*) " Improve- " ments in signalling from one part of a railway train to another."

"This invention relates to a method by which each passenger is "placed in direct communication with an attendant by means of "an electric bell placed in each carriage of a train in connection "with an indicating system placed in a compartment occupied by "an attendant, whose special duty is to attend to the signals."

"The methods of application of the apparatus are various; the "electric currents may be supplied either by galvanic piles or "electro-magnetic apparatus. The conducting wires are attached "to each carriage, and hooked together at each end by metal "hooks, which may be solid with, or fixed to the draw bars & "couplings or hooks, and drag chains, whereby to effect automati-"cally the junction and disjunction of the wires.

"The attendant reaches the various compartments either by "means of longitudinal footboards adapted for the purpose, or "by a way over the roofs of the carriages, the compartments of "which may communicate with each other by windows or other "openings. This invention thus consists of placing an electric "signal apparatus in each compartment of a railway train in con-"nection with an indicating system in the box of an attendant "exclusively charged with such duty."

[Printed, 4d. No Drawings.]

A.D. 1860, December 18.—N° 3103.

SILAS, FERDINAND.—(*Provisional Protection only.*) "An "aerostatic signal apparatus, to be called 'semasphere.'"

"This invention relates to the application of a new process, by "means of balloons raised to a certain height, and secured to the "ground or other objects by means of ropes or cables, on which "lamps or other signal lights may be fixed, so that when in a cer-"tain position both their numbers and colours may represent "certain signals. Although the lights now in use on land and "at sea may be easily adapted to the semasphere, the object of "these signal balloons consists in producing a powerful focus of "light, either by electricity, by the lime light, by means of Fitz-"maurice's light, or by various other means already in use, but "especially by the phosphuretted hydrogen, either with or with-"out oxygen." "When the electric light is used the ropes may "serve as conductors, but then the battery will be on the ground." "The semasphere may be used in the navy, in harbours, in light-"houses, during sieges, and generally whenever a powerful light

" is required; they may be employed also as day signals, and
" finally they may serve as lightning conductors or electro-
" substractors, and in those cases they are provided with metallic
" points communicating with the ground through metallic wires
" running along the ropes."

[Printed, 4d. No Drawings.]

A.D. 1860, December 21.—N° 3138.

CHATTERTON, John, and SMITH, Willoughby.—" Improvements in the manufacture of electric telegraph cables."

This invention " consists in saturating or coating the yarns or " other fibrous materials used to 'serve' or surround the insulated conductors with a conducting fluid such as water, in order " that any defect in the insulation which may occur may at " once be detected, both when the insulated conductors are being " 'served,' and also when the wires or wire strands are being laid " around them; the insulated conductor or conductors being at " the same time" " kept constantly under an electrical test."

Tar water or tan liquor is preferred for the above-mentioned " conducting fluid."

" The insulated conductor for a cable in place of being dry " when passing to a 'serving' machine, is immersed in water or " suitable conducting fluid, or is moistened therewith, and passes " in a moistened state to the 'serving' machine, and the 'served' " insulated conductor is also immersed in water or other suitable " conducting fluid, or is moistened therewith as it is passed into " the laying machine."

" In order to coat and preserve the external or protecting wires " or wire strands of an electric telegraph cable, the cable as it " comes from the laying machine is caused to pass through a " vessel or trough containing a mixture of tar thickened to a " suitable consistency with wood or cork dust, or mineral oxides, " such mixture being used in a cold state; and the cable is then " wrapped round or 'served' with a tape or suitable bandage."

[Printed, 4d. No Drawings.]

A.D. 1860, December 21.—N° 3142.

JOHNSON, John Henry (*a communication from Hypolite Worms.*) — (*Provisional Protection only.*) " Improvements in " magneto-electric machines."

This invention "consists in grouping the helices in fours, or in "pairs, and connecting their opposite poles to one common con-"ductor, which communicates with the commutator. The com-"mutator consists of a number of divided rings, to each half of "which is connected a wire or conductor leading to a corre-"sponding circle of helices. Upon these rings bear the electrodes, "which are either made to run thereon or provided with anti-"friction rollers and springs, so as to reduce the friction. The "cores of the helices are made of tubular sheet metal, but are "slid" [slit?] "down one side, by which means the development "of induced currents is obviated; these cores may be made of "several thicknesses, or a number of cores of different diameters "may be inserted one within the other, by which means the "power of the coil will be increased. The wire, in place of being "wound singly, is wound in the form of a flat band or riband "of several wires." "In order to collect the currents without the "aid of a commutator, it is proposed to connect one end of the "wire of the helices to an insulated conducting rod or spindle "contained inside the main shaft of the machine. The outer end "of this conductor is in electric contact with a screw, also insu-"lated from the framing which supports it, and to this screw is "connected a wire, which conducts the current to any desired "point. The other end of the coil wire is simply connected to "the surface of the main shaft of the machine, and a binding "screw on the plummer-block serves for the attachment of a "second wire, which is also carried to the point where the current "is to operate."

[Printed, 4*d*. No Drawings.]

A.D. 1860, December 22.—N° 3148.

SANDYS, George.—"A novel instrument or apparatus for "conveying signals or communicating intelligence between rail-"way stations and other distant points."

Instead of using an ordinary horseshoe electro-magnet to work the pointer or needle of the telegraph instrument, two bar electro-magnets, placed side by side, are employed; "or instead of two "soft iron cores only, they may be divided in their length, and "be rejoined by an armature or soft iron connecting piece, back "to back, so that four distinct poles" are still left for working the instrument. An armature at one end of the electro-magnetic

coils is connected with the bell hammer, and another armature at the other end of the coils acts upon the permanently magnetic tail-piece of the suspended pointer. The pointer or needle is deflected to one of two positions, according to the motion of the transmitting key, by electric currents in one direction or in the opposite direction. If the currents are all in one direction, "any "number of strokes may be given to the hammer acting upon "the bell, and this is effected without affecting the position of "the needle after first contact has been made;" the needle and bell action are thus combined.

For railway purposes the two signals to which the needle is capable of pointing may be "train out" and "clear."

In a modification of the above instrument, pole pieces, fixed on a horseshoe electro-magnet, deflect the armature, and the spindle of the said armature is connected with that of the pointer by a wheel and pinion, thereby increasing the arc of deflection of the pointer. "The introduction of the projections from the soft iron "cores enables the bell armature to be placed in front."

Another mode of increasing the arc of deflection of the pointer is by means of a "jaw-formed termination," in which the armature works, the armature and pointer vibrating on separate centres.

The modifications are not set forth in the Provisional Specification.

[Printed, 10*d*. Drawings.]

1861

A.D. 1861, January 7.—N° 44.

BAGLEY, William, and **MINCHER**, William.—(*Provisional Protection only*.) "Certain improvements in coating metals and "alloys of metals."

"The sheet or other article, if of iron or steel, is first scaled in "the ordinary way, then pickled in a bath of diluted muriatic "acid, after which it is to be suspended in a bath consisting of "muriatic acid saturated with zinc, a slight excess of muriatic "acid being afterwards added to make the solution sufficiently "active. In the same bath, and attached to one pole of a battery,

" is a piece of zinc, the article to be coated being connected to the " opposite pole, thus a coating of zinc is deposited upon the " sheet, forming a flux or base to receive the subsequent coating " of lead or alloy of lead and copper which is to be applied by " immersing the sheet in a bath of molten lead, or of lead alloyed " with copper. This process may also be effected without the " employment of the battery above-named by dipping the sheet " in a solution of chloride of zinc to form the flux before coating " with the molten metal.

" In coating articles of copper, zinc, or any of their alloys, the " first process, namely, scaling, will be dispensed with, simple " cleansing by means of a bath of aquafortis being employed in " its stead."

Printed, 4*d*. No Drawings.]

A.D. 1861, January 8.—N° 47.

HIRSCH, Hermann.—(*Provisional Protection only.*) "Improvements in insulating the conducting wires used for telegraphic purposes."

The inventor states:—" My invention consists in insulating the " conducting wires used for telegraphic purposes by covering " such wires with spun glass; when it is required to fill up the " interstices between the glass fibres I use resinous, tarry, or other " suitable material."

[Printed, 4*d*. No Drawings.]

A.D. 1861, January 14.—N° 103.

CLIFFORD, Henry (*partly a communication from Samuel Canning*). — (*Provisional Protection only.*) " Improvements in " apparatus to be employed in coiling and paying-out electric " telegraph cables."

1st. " The employment of a series or of two series of frames, " the object of which is to assist in keeping the successive coils " of cable in their places during the process of coiling, and espe- " cially for preventing the cable from falling into the eye, and for " supporting it while being coiled on board ship. Each of the " said frames is of a knee form, and has both vertical and hori- " zontal limbs. Either an internal series only or both an internal " and an external series, may be employed." The horizontal arms of the frames are introduced under the first flake of the cable.

"When the cable is coiled as high as the top of the first set of "knee frames, another set is introduced, as before, and so on until "the entire cable is coiled."

2nd. The employment of a frame to facilitate the paying out of the cable. The said frame "consists of radial arms and diagonal "cross pieces, the radial arms being being furnished at their ex-"tremities with prongs or guides, which partially embrace and "slide up and down against the standards which confine the coil. "When these standards are inclined, the arms are formed so that "they may contract and expand, in order that they may always "reach and be guided by the standards, a telescopic arrangement "of the arms being preferred for this purpose. The frame may "be made of any suitable material, and is simply laid upon the "coil, the cable being withdrawn from under it."

[Printed, 4d. No Drawings.]

A.D. 1861, January 14.—N° 107.

JOHNSON, John Henry (*a communication from Jean Joseph Etienne Lenoir*).—"Improvements in machinery or apparatus for "obtaining motive power."

This invention relates to certain improvements upon the reciprocating gas motive power engine, described in N° 335 (A.D. 1860).

A peculiar arrangement of distributing valve is adopted "for "effecting the admission of the air and gas into the cylinder in "regular layers or strata." "In addition to the air it is pro-"posed to admit a certain amount of low-pressure steam or moist "vapour," or "fine spray" of water "into the cylinder, so that on "the ignition of the gas the steam or vapour," or spray, "will be "heated and considerably expanded, thereby increasing the effect "of the engine." "The cylinder is surrounded with a cold "water jacket, and the covers are also made hollow and filled "with cold water."

There are two "electric igniters," one at each end of the cylinder; the two wires forming one "igniter," and required to produce the spark, are placed in a porcelain or other suitable non-conducting rod, which is fixed inside a metal plug screwed into the cylinder cover. "A metal slide carried by the cross-head of the piston "rod" makes electrical contact with certain insulated plates that are respectively connected with the "igniters," so that the

"circuit is made, and a spark is produced in each end of the "cylinder alternately, so as to explode the gas and air which have "been drawn or sucked in by the piston at the commencement of "its stroke when under the influence only of the fly wheel." The electric force required to produce the spark is preferably obtained from Ruhmkoff's coil.

[Printed, 1s. Drawing.]

A.D. 1861, January 19.—N° 145.

PIFFARD, Bernard.—"Improvements in the preparation of "non-conducting substances for the deposition thereon of metals "by electric action."

"The non-conducting surface is to be first coated all over with "a saturated solution of nitrate of silver, taking care that the "solution adheres to all parts of the surface which it is desired "should be made conducting. The surfaces thus coated are then "to be dried, and they are then to be subjected to the action of "sulphuretted hydrogen gas till the silver is rendered metallic;" this "may be most conveniently done by streams or jets of such "gas against the coated surfaces. In those cases where the non-"conducting surfaces are greasy or wanting in cleanliness, they "should be well cleansed before applying the solution of nitrate "of silver, in order to insure that the solution will adhere all over "the surface. When gutta percha is the non-conducting surface" it is "advantageous to wash the surface quickly with oil of tur-"pentine, and to dry it, and then to apply the coating of the "solution of nitrate of silver. In those cases where the solution "of nitrate of silver will readily adhere, no preparation of the "surface is required.

"Surfaces thus rendered conducting are then suitable for "having metals deposited thereon by electric currents, as is well "understood."

[Printed, 4d. No Drawings.]

A.D. 1861, January 19.—N° 146.

CROZIER, William.—(*Provisional Protection only.*) "Im-"proved means of communication on railways for the prevention "of accidents."

"Each locomotive engine, station, guard's van, signalman's "house, and other carriages and places is or may be provided

" with an insulated electric battery or batteries, with such bells, " wires, dials, and other appliances as may be found necessary for " transmitting and communicating signals. A communication " or connexion, travelling or stationary, is made to either or any " of the lines of rails or existing telegraph wires, or wires, rods, " bars, or other electric conductors, continuous or broken, to be " laid for the purpose alongside, near, or over any line of rails.

" By those means an electrical communication is made between " one engine and another, or between engine driver and signal- " man, station master, or other person having charge of any fixed " or travelling battery or signal, or between the engine driver and " guard of the same or any other train.

" Signals will be communicated from any of the above-named " persons or places to any other by means of bells, dials, or " other contrivances, which will be hereafter fully described in the " Complete Specification of the said invention."

[Printed, 4d. No Drawings.]

A.D. 1861, January 22.—N° 175.

CHATTERTON, JOHN, and SMITH, WILLOUGHBY.—" Im- " provements in the manufacture of telegraphic cables."

" In order that the gutta percha insulating coatings should not be " subjected to heat in the process of manufacturing a cable, as has " heretofore been the case, when applying hot pitch, rosin, and " other matters together with or after the fibrous materials and " wire coatings have been applied around the gutta percha coated " wires," the inventors " apply oxides or carbonates of lead or " other preparation of that or other metal combined with tar, oil, " or varnish, together with the fibrous materials used externally " of the insulating gutta percha coatings, whether wire be em- " ployed as well as fibrous materials to give strength to the cable " or not. For these purposes the fibrous material used, whether " made up in the form of tape, yarn, cord, or otherwise, is coated " or saturated with the paint or compcsition above mentioned, " and by preference in the act of applying such fibrous materials, " and whether such fibrous materials are wound spirally around " or laid longitudinally over the surfaces of the gutta percha, and " it is preferred to bind an uncoated tape exterior of the saturated " coatings of fibre in order that the cable may be at once coiled."

" When iron or steel wires are used to give strength to the

"electric telegraph cable." "they should each be first covered "with fibrous materials saturated or coated with the paint above "mentioned."

When the above-mentioned fibrous materials are not to be "applied to the individual wires used to give strength to a tele-"graphic cable," the said wires are first to be applied to the gutta percha core, and the saturated fibrous materials are to be "served" over the said wires.

[Printed, 4d. No Drawings.]

A.D. 1861, January 24.—N° 193.

SELBY, GEORGE THOMAS.—(*Provisional Protection only.*) "Im-"provements in the construction of masts and posts."

This invention "consists in constructing ships' and other masts, "*telegraph* and other posts, of tubes of wrought iron combined "and united to form a light and strong structure. As an instance, "one form of combination suitable for a telegraph post is com-"posed of three wrought-iron tubes, screwed into or otherwise "fixed on a base of metal, wood, or stone; each of the tubes is "made to incline inwards towards the top, where they are united "in a disc or ring of less diameter than that of the base; a stay "may be added, if required to strengthen the compound post, at "or about the centre. Again, for a mast a central and larger "tube may be carried up from the base through the disc or ring, "a number of these parts or combinations may be joined together, "the tubes may be of a large diameter at the base, and may be "made gradually decreasing in diameter towards the top, or they "may be of the same diameter throughout."

[Printed, 4d. No Drawings.]

A.D. 1861, January 31.—N° 260.

MOULTON, STEPHEN.—(*Provisional Protection only.*) "Im-"provements in the construction of cables for telegraphic pur-"poses."

The inventor states:—"This invention has for its object im-"provements in the construction of submarine or other telegraph "cables, by which any undue strain on the insulated wire or wires "is prevented; and my improvements consist in embedding a "spiral metal wire (for the purpose of insulating the same) in a "strand or cord of india-rubber, and then 'curing' or 'vul-

canizing' the india-rubber, with the wire therein, by means of
" sulphur or its compounds, as is well understood in the manu-
" facture of other articles of india-rubber treated with sulphur or
" its compounds. Spiral wires for telegraphic purposes thus pro-
" tected will readily accomodate themselves to any ordinary strain
" to which submarine or other telegraph cables are subject, with-
" out injury to the wire, whilst the india-rubber remains intact;
" and the cable may be coated or covered with hemp, wire, or
" other protecting materials, provided such coating or covering
" does not injuriously affect its elasticity."

[Printed, 4*d*. No Drawings.]

A.D. 1861, February 1.—N° 271.

DE ARRIETA, José Joaquin.—"Certain applications of cha-
" papote and its products, and of the same combined with other
" substances, and of materials treated therewith, to various pur-
" poses in manufactures and the useful arts;" one of the said
applications is to insulate and protect telegraphic wires.

"This invention relates to the employment for various useful
" purposes of a certain natural matter called in Cuba chapapote,
" whether in its concrete (or solid) or its viscous, pasty, or more
" or less fluid condition, and whether alone or combined with
" other substances."

"When telegraphic wires treated with chapapote are encased in
" tubes, as for underground communications, the spaces between
" the wires or its covering and the inside of the tube may be
" filled up with chapapote. Coal tar, or vegetable or mineral
" tar may be used with advantage as a preliminary coating for
" wire (or for coating the paper wrapped round it when used)
" before subjecting the same to the chapapote; powdered quartz
" or other silicious and vitreous matter may be mixed up with the
" chapapote for coating wires, or the fibrous coverings thereof."

"A strong fabric may be manufactured by coating or saturating
" paper, pasteboard, or the like, or textile, felted, and fibrous
" fabrics with chapapote," suitable, amongst other purposes, for
telegraphic insulators.

"The substance referred to in this Specification as being called
" in Cuba 'chapapote' is sometimes called in this country and
" elsewhere by various other names, and is found in other places
" besides Cuba."

[Printed, 6*d*. No Drawings.]

A.D. 1861, February 2.—N° 278.

HUGHES, EDWARD THOMAS (*a communication from Eugène Mouline*).—" Improvements in the manufacture of woven fabrics, " and in the machinery employed therein."

One of the chief peculiarities of the loom which forms the subject of this Specification is, that a to-and-fro motion is imparted to its iron shuttle by means of an electro-magnet; the shuttle is mounted on small wheels, which run on the warp threads. " The most important difference in the slay is that in " the body there is a longitudinal slot or groove," in which a " rectangular case " carrying the electro-magnet " can move freely " from end to end."

In one instance, motion is given to the electro-magnet by means of pulleys, one of which " turns to and fro alternately;" in a second instance, levers worked by cams are employed as well as pulleys.

" For weaving striped fabrics and checks there may be placed, " as in ordinary looms, a row of boxes containing two or three " shuttles at each end of the slay, which shuttles may be shifted " as required by two strong hooks having their movement regu- " lated by cards of the jacquard apparatus." The power of the electro-magnet ought not to be so strong as to " hinder the " changing of the boxes and shuttles. In weaving ribbons there " are as many iron or plated shuttles and electro-magnets used as " there are ribbons to be woven at the same time; the said " magnets receive their alternate motion from a pinion, and be- " tween each ribbon there is a small box to hold the shuttle " whilst the slay beats up."

[Printed, 1*s*. 4*d*. Drawings.]

A.D. 1861, February 8.—N° 322.

BRANSCOMBE, JOHN.—" Improvements in telegraph cables."

" According to this invention the insulated wires are coated " with leather, which is, by preference, served round the insulated " wire or wires, and the external protecting wires are laid over " the serving of leather; the leather makes a good bed for the " protecting wires to lay on, and prevents them cutting into the " insulating material, while, at the same time, the leather, particu- " larly when in a moist state, being a sufficiently good conductor

"of electricity, any defect in the insulating material will readily "be detected on testing the cable."

"A skin of leather, by preference, sheep skin, commonly called "basil," is cut into strips of a suitable width, which are joined "either by sewing, rivetting, or adhesive compound, such as "marine glue," so as to "form a long ribbon or tape;" this strip is applied as a "serving" to an insulated wire, by an ordinary taping machine. Should two coatings of the leather ribbon be required, they are put on "in reverse layers by a double "machine at one operation. The leather being wet, and consequently a conductor, enables the core to be continually under "an electrical test throughout the process of making it into a "cable. The outer protecting wires are afterwards applied in the "usual manner."

[Printed, 4d. No Drawings.]

A.D. 1861, February 9.—N° 329.

KERR, DAVID.—(*Provisional Protection only.*) "Improvements "in the construction of submarine telegraphic cables, and in the "means of protecting the same from undue strain or wear and "tear."

1st. "A novel mode of constructing the cable." The conducting wire or wires is or are coated with a composition containing gutta percha and vegetable or other wax. The insulated conductor is enclosed within a copper or other metal tube, which is "painted "over with a waterproof composition, such as marine glue or "gutta percha and tar melted together, and made thin enough to "be applied with facility." A covering of whalebone is then laid round the cable, another coating of marine glue, and, finally, "a "spiral covering of zinc or other metal cut into strips." More layers of whalebone, "and also of helical metal coverings, may "be employed if desired." "The external metal covering may "also be secured by an outer covering of twine or string coated "with tar or other suitable material or composition."

2nd. "Adapting or attaching the above or other submarine "telegraphic cables to a chain cable of suitable strength and "dimensions." It is preferred to make the links of the chain cable "long, and with holes through their ends, through which "the telegraphic cable may be passed, so that it will lie between "the side pieces of the links." "A convenient form of link for

"the above purpose is one resembling an elongated shackle, but "other forms of link may be employed as above mentioned, if "desired."

[Printed, 4d. No Drawings.]

A.D. 1861, February 11.—N° 343.

CLARKE, William Saint Thomas.—(*Provisional Protection only.*) "A railway break."

The nature of this invention is as follows:—"In intersecting "the axle or axles of the driving wheels of locomotives trans- "versely with a current of electricity, and in intersecting the axle "or axles of the locomotive and the axles of the tender and car- "riages, and the axle or axles of the locomotive and the axles of "the tender and luggage vans, waggons, or trucks transversely "with a single or with separate currents of electricity, whereby "most efficient 'grip' or 'bite' on the rails will be obtained."

[Printed, 4d. No Drawings.]

A.D. 1861, February 12.—N° 353.

PARKES, Alexander.—(*Provisional Protection only.*) The inventor states:—"This invention has for its object improvements "in electric telegraph conductors." For these "purposes, when "the conductors are composed of copper, in order to increase the "conducting power, in place of drawing or rolling out a rod of "copper to the desired size and section as heretofore, I employ "one or more tubes, and place them one within the other, gene- "rally filling the centre with a solid rod of copper. I then ex- "tend the same by drawing or rolling; and when using silver in "combination with copper as a conductor, in order to increase "the conducting power, I proceed as follows:—I place a tube or "rod of silver within a tube of copper, or I introduce several tubes "or rods of silver into an outer tube or tubes of copper, or silver "and copper may alternate. These are then drawn or rolled "down to the desired extent, the object being to obtain silver "within copper, and in place of the silver being prepared se- "parately the tubes or rods introduced into copper tubes may be "first electrotyped or coated with silver before introducing them "into the outer tube of copper; or copper may be deposited on "to silver, and in that condition drawn or rolled. It is desirable

"that the copper and the silver used should be as pure as may be
"though the same may be alloyed with each other, and to some,
"extent with other metals."

[Printed, 4d. No Drawings.]

A.D. 1861, February 18.—N° 400.

BARNES, EDMUND FORMAN.—"Improvements in instruments, "or a combination of conductors and attachments, for transmitting and recording messages in any form of letter or character "by means of electricity or electro-magnetism acting either mechanically or chemically, and which invention may also be applied to the transmitting or copying figures, as maps of any "form of outline."

By means of five telegraph wires and five separate electric circuits, combined in one set of telegraph instruments, letters or others symbols are sent from the transmitting station to the receiving station. One lever of the transmitting instrument and one electro-magnet of the receiving instrument are included in each circuit, so that there are five levers in the transmitting instrument and five electro-magnets in the receiving instrument. The telegraphic message is set up in type, which is passed in succession under the extremities of the above-mentioned levers, the said extremities being placed in a line transverse to the direction of motion of the type; the circuits thus completed by the other extremities of the levers at the transmitting station actuate corresponding electro-magnets at the receiving station, so that, according to the sequence and position of the circuits established, the armature levers of the electro-magnets are depressed, and the corresponding marks made upon the travelling strip of paper.

The marks may be made chemically or mechanically; when ink is used inking rollers are employed, or one arm of the lever is made hollow.

The five circuits correspond to the five "elemental divisions" of the letters of the English alphabet, but when maps are copied the number of circuits is increased.

[Printed, 8d. Drawing.]

A.D. 1861, February 20.—N° 416.

NICOLL, BENJAMIN.—(*Complete Specification but no Letters Patent.*) "An improved method of treating needles used in sew-

" ing and other machines, applicable also to those parts of such " machines that hold the needles, and applicable to all other " descriptions of needles, and to scissors, and to thimbles treated " in like manner."

This invention "consists in magnetising scissors, thimbles, and " also all kinds of needles used for sewing purposes, including " stitching, sewing, hemming, embroidery (whether done by hand " or by machine), and also those parts of machines that hold the " needles, so as to facilitate the adjustment of them to the " machine, and by its means they can be placed quickly to the " nicety required."

The application of this invention "to scissars and thimbles will " enable the sewer to place needles when not in use upon them, " thereby preventing their being lost, and will enable persons to " pick up needles more easily."

[Printed, 4*d*. No Drawings.]

A.D. 1861, February 22.—N° 448.

HORWOOD, ALBERT.—" Improvements in the application of " electricity for communicating by signals with carriages in motion " on railways."

Three insulated metallic bars are laid between the rails of a railway, one in the centre between the two rails, and each of the other two equidistant from the centre bar, one on each side thereof. A voltaic battery at the station to be communicated with has one of its poles connected to the middle bar, and the other to the two outside bars; there is also a "pole changer" and an alarum at the station. On the locomotive is an indicating apparatus and certain springs and connections that complete the circuit with the battery and alarum at the station by constantly bearing on two of the metallic bars.

When the locomotive passes over the said bars it completes the electric circuit and rings the alarum at the station; the station clerk then actuates the "pole changer" so as to indicate either "clear" or "danger" to the driver by means of the indicator on the locomotive.

The object of the two outside metallic bars is to enable the spring connecting apparatus to act whichever end of the locomotive is foremost. The spring apparatus consists of two iron tubes projecting downwards from the buffer beam, into each of which a

wooden plug carrying another iron tube is fitted; to each of the lower iron tubes a magnetized bar is hinged, and helical or other springs cause the magnetized bar to bear upon one of the insulated metallic bars.

By means of a suitably placed piece of soft iron, the pointer of the galvanometer indicating instrument is kept in the position signalled from the station, and released therefrom by the engine driver by means of a sliding rod and spring.

[Printed, 1*s*. 10*d*. Drawings.]

A.D. 1861, February 22.—N° 449.

REEVES, John.—"Improvements in electro-magnetic engines "for obtaining and applying motive power."

"A series of helices of suitable form are arranged in a circle so "as to admit of the magnets (which are carried by a circular "metallic ring) passing as they revolve through the helices, the "rotatory motion of the magnets being caused by currents of "electricity from a galvanic battery. The helices are attached to "a rim of metal affixed to a back plate which supports the "machinery. The metallic magnet ring is formed with cogs or "teeth by which the motion of the magnet ring is communicated "to the driving wheel by toothed gearing, and there is suitable "apparatus applied for making and breaking contact with the "wires of the galvanic battery and with those on the helices by "means of apparatus affixed to the driving wheel. Friction "wheels are arranged upon the metallic magnet ring to act as "guides and reduce friction."

The "metallic magnet ring" has its outer surface "composed "of alternate surfaces of iron and brass or other metal." The said ring "is supported on a series of friction rollers," whose axes are fixed to the framing that carries the coils.

The same framing that carries the coils also supports the driving wheel axis concentric with the centre of motion of the "ring." The commutating apparatus consists of a suitably shaped cam on the driving wheel axis, which brings the extremities of levers together at the proper times by means of certain "friction rollers" or wheels that bear on the projecting portions of the cam surface.

[Printed, 1*s*. 2*d*. Drawings.]

A.D. 1861, February 23.—N° 466.

BROOKE, William O'Shaughnessy.—(*Provisional Protection only.*) "Improvements in apparatus for suspending electric tele-"graph wires."

"An inverted cup or hollow vessel, by preference of cast iron, and "of a rectangular form is used, the upper end of which is closed, "and has formed on it a recess suitable for receiving and having "a wire fixed therein by solder. The edges of the sides, at their "lower ends, are turned up into a trough or gutter like "form. On the interior of this inverted cup or hollow vessel "is fixed another hollow inverted cup or vessel composed of "the hard compound produced by combining india-rubber and "sulphur, and submitting the same to high temperatures till "converted or changed into what is known as the hard compound "of india-rubber. This inner cup or hollow vessel is of like sec-"tion to the outer cup or vessel above mentioned, but of less "dimensions, so as to leave a space in all directions between "the inner and outer cups or hollow vessels, and such space "is filled up with melted sulphur. This apparatus is placed on "an upright pin or support, by preference of wrought iron, "though other material may be used, and such pin or projection is "of like section to the interior of the inner inverted cup or vessel, "but of different dimensions, so as to leave a space in all directions "between the pin or support and the interior of the cup or vessel, "which is filled with melted sulphur. The pin or support is "carried by a bracket or post, or other suitable means.

[Printed, 4*d*. No Drawings.]

A.D. 1861, February 25.—N° 481.

CLARK, George.—(*Provisional Protection only.*) "Improve-"ments in the manufacture and mode of laying down submarine "electro-telegraphic cables."

1st. Electric "safety branch cables" are connected to the main telegraphic cable at suitable distances from each other. As the cable is run out from the paying-out vessel, the first branch presents itself, and is "handed over" to a steam tender alongside; this steam tender remains stationary, supporting its branch, until the second branch is similarly secured to a second steam tender; the first steam tender then casts off "its branch (insulated at the "end) into the sea," and proceeds at full speed to overtake the

paying-out vessel in time to receive and retain the third branch, until, by the fixing of a fourth branch to the second tender, it is at liberty to again start to overtake the vessel in time to receive and retain a fifth branch, and so on, until the finish of the operation of paying out the cable. By this means the cable is divided into sections, and not more than one section of the main telegraphic cable could be lost at one time, " and even that loss might " be recovered if it were thought advisable to underlay the broken " section by hauling up by means of the branch." " By em- " ploying three tenders two branches might be kept above water " at a time, which would afford greater security." The metallic continuity of the conducting wires in the branches with those in the main cable is ensured by soldering or otherwise uniting at the joint.

2nd. Branch cables, which are " not electrical media of con- " tinuity with the main," may be used when reliance is placed upon recovering the lost section of the cable by underrunning.

[Printed, 4d. No Drawings.]

A.D. 1861, February 27.—N° 508.

HENRY, MICHAEL (*a communication from Gaspard Félix Tournachon, called Nadar*).—(*Provisional Protection only.*) " Im- " provements in photography," in which the electric light may be used.

The inventor combines " the employment of electric light or " of gaslight with Moitessier's mode of obtaining positives or " positive photographs, photographic proofs, or impressions." " The artificial light employed in this invention can be con- " trolled, so that proofs may be obtained of various effects and " faulty negatives corrected." " The artificial light can be ap- " plied instead of solar light on the magnifying object glass or " lens in taking natural size images; moreover by these means " the operator dispenses with a separate room for preparing and " developing his plate as he can direct the circumscribed rays of " the reflector on the objectivity (objectivité), for the use of this " artificial light permits the performance of various operations " that have hitherto been performed away from the room exposed " to the full daylight." The inventor proposes " to modify, as " follows, Moitessier's method to adapt it for purposes of taking " positives by artificial light. Hitherto in known processes " frames only have been employed," whereas it is proposed " to

" use two dark chambers, in one of which are placed the negative " plates, or stereotype plates, or clichés, and in the other chamber " are placed the glasses treated with collodion intende for the " reproduction of the positive stereotype or cliché. The two dark " chambers are placed opposite one another, and the space be- " tween them is kept dark by a covering; the chambers can be " brought mutually nearer or farther according to the sizes to be " produced; the light is placed in front of the first dark chamber " and concentrated by a reflector on the negative plate, stereotype " plate, or cliché."

[Printed, 4*d*. No Drawings.]

A.D. 1861, March 4.—N° 549.

HIRSCH, Hermann.—" Improvements in insulating and cover- " ing the conducting wires used for telegraphic purposes."

In the first instance the conducting wire is covered with spun glass, as set forth in N° 47 (A.D. 1861.) " This spun glass is to " be wound round the wire, not in a coil or bulk but in thin loose " fibres, sufficient to completely cover the surface of the wire." Over this, strips of copper or other metallic foil are wound " in a " spiral or other form, the edges of which strips slightly overlap." The wire so coated is passed through a " fluid metallic bath of " high temperature," or subjected " to the action of electro- " galvanism." When the copper covering is to be used as a second conducting medium " the spun glass is to be again " applied and covered with metallic strips and treated in the bath " as before described."

In cases where several separate conducting mediums are employed, several copper strips are wound " in a long spiral form " " without being in close contact with each other, or one only may " be applied, when a thin coating of spun glass is placed over it, " and in the intervals or spaces another strip may be wound, and " so on." " After these stripes are wound as desired, another " layer of spun glass is to be placed over the whole, and again " covered with a metallic foil and passed through the bath, or " subjected to the action of the battery, as before described."

" Gutta percha, india-rubber, or other suitable material may be " used either beneath or above the layer of spun glass, but in all " cases the outer covering or casing must be metallic, as above " mentioned."

[Printed, 4*d*. No Drawings.]

A.D. 1861, March 5.—N° 567.

JOHNSON, JOHN HENRY (*a communication from Edmond Hiffelsheim, Gustave Hagen, and Paul Baudet*).—(*Provisional Protection only.*) " Improvements in apparatus for administering " medicated and voltaic baths."

" This invention relates to the administering of medicated and " voltaic baths, and consists in the employment of a bath pro- " vided with a lining of gutta percha or other non-conductor of " electricity, the shape of the bath being, by preference, made to " conform to that of the human figure to a certain extent. In " order to admit of the greater portion of the head of the patient " being submerged, it is proposed to fix inside the head of the " bath an adjustable support or holder for the back of the head, " such support, being made of non-conducting material, and being " capable of adjustment, either by the patient himself or by an " attendant, so as to regulate the amount of immersion of the " head. One pole of the battery is connected by a submerged " plate with the water of the bath, whilst a wire connected with " the other pole, and provided with a suitable knob or handle " held in the hand of the patient, completes the circuit. Suitable " arm rests or supports are fitted inside the bath for supporting " the arm or arms of the patient, and the usual well-known " instruments may be employed for measuring or indicating the " direction, intensity, and quantity of the electric current."

[Printed, 4*d*. No Drawings.]

A.D. 1861, March 6.—N° 569.

SILVER, HUGH ADAMS, and GRIFFIN, HENRY.—" Improve- " ments in the manufacture of insulators and other articles in " India-rubber, which are required to retain a shape once given to " them; in curing hard rubber, ebonite, or vulcanite goods; in " moulding India-rubber articles; in the construction of cellular " fabrics in India-rubber; and in forming articles partly of soft " and partly of hard rubber, or ebonite, or vulcanite, and in " varnishes for India-rubber goods."

1st. Insulators, &c. " Forming them of two or more sheets or " surfaces of india-rubber," with a layer of cloth " interposed " for the purpose of supporting such articles during the process " of curing or manufacture."

2nd. Curing India-rubber goods by protecting them from the direct action of steam during the process.

3rd. Moulding India-rubber insulators or other articles. "The "employment of a single shape or form of the internal configura-"tion" of the intended insulator, over which form the article is applied in a soft state; the process of vulcanizing causes the shape to be retained. Another method consists in using moulds of French chalk.

4th. The construction of cellular fabrics in India-rubber. Parallel alternate slits are cut in India-rubber sheets, and the sides of the sheet are drawn apart.

5th. Forming articles partly of hard and partly of soft rubber. The articles are suitably prepared in the soft state and then cured or vulcanized.

6th. Varnishes. The ingredients which enter into the composition of one or other of these varnishes are:—India-rubber, naptha, vegetable black, bitumen, gutta percha, shellac, resin, and boiled linseed oil. These varnishes may be used for the above-described insulators.

[Printed, 6*d*. Drawing.]

A.D. 1861, March 7.—N° 579.

EVANS, THOMAS WILLIAM.—"Improvements in telegraphic "cables."

To form the conductor, "seven copper wires (drawn from per-"fectly pure metal)" are placed "in parallel lines in close con-"tact with each other," and drawn "all together through a "round holed draw plate."

Upon the cylindrical conductor, prepared as above, an electro-coating of gold is superimposed, so that "the danger of any "chemical action upon the conductor from the contact of the "insulation is entirely avoided."

To avoid the action of the sulphur of the ordinary vulcanized caoutchouc upon the conducting wire, three distinct insulating coats are employed—"an interior one of pure caoutchouc, a "second of gutta percha, and a third of caoutchouc." Long narrow bands, cut from thin sheets of India-rubber, are united together end to end, and stretched "to such a degree as to lose "their elasticity," the resulting inelastic cord is then helically wound upon the metallic wire conductor. The coating of gutta

percha is imposed "in a semi-liquid state," "and upon this "is placed a third coating of caoutchouc either pure or combined "with pulverized glass, feldspar, sand, or other non-conducting "substances;" this last caoutchouc coating is then vulcanized by the cold process, and the conductor, thus coated, is submitted to a gentle heat. The gutta percha softens and unites the two caoutchouc coverings, and the inner caoutchouc coating endeavours to contract. These effects of the application of heat tend to "the solid union of all the coats of the insulation, and the "total exclusion of air."

This insulated conductor may be covered "with an external "envelope of hemp or other fibrous material wrought in the usual "fashion of ships' cordage."

[Printed, 4*d*. No Drawings.]

A.D. 1861, March 12.—N° 610.

RIPAMONTI, Grégoire Lucien.—(*Provisional Protection only.*) The title of this invention is "Improvements in the "nautical compass."

The inventor states:—"The object of my invention is to render "the mariners' compass independant of magnetic influence on "board ship, specially iron ships; and my improvement consists in "placing beneath the card a number of magnetized needles, say, "twenty-four (but this number may be increased or diminished), "parallel to each other, and with their points directed due north "and south."

[Printed, 4*d*. No Drawings.]

A.D. 1861, March 16.—N° 669.

PRINCE, Alexander (*a communication from Julius Imme*).— "An improved electro-galvanic friction brush."

"A strip of leather is bent in a semicircular form and attached "at its ends to an oblong wooden frame. In the leather are to be "inserted pins of silver-plated wire about half an inch in length, "stuck in close rows; these pins are provided with heads, at the "back of which is placed a curved zinc plate in close proximity "to the pin heads and touching every one. The ends of the "zinc plat rest upon a plain polished copper plate, which is fastened in the before-mentioned wooden frame. Against this "copper plate is laid a piece of felted cloth, succeeding which is

"a polished zinc plate, to which is added a polished copper plate, "and then another piece of felted cloth, and lastly a polished "zinc plate. The felted cloths are to be taken out and dipped "into salt water, they are then replaced with the plates, in the "order before-mentioned, when the galvanic current will pass "through the curved zinc plate into the pins. The brush is to "be held so that the hand touches the last zinc plate, the body "coming by that means in contact with the zinc pole. Then by "brushing another part of the body (the copper plate being "brought into contact with the body) the electro-galvanic chain "will be closed by this operation, and the current will pass "through the body. Should one person be operated upon or "brushed by another, the chain will then be simply formed by "brushing with one hand and placing the other hand on the "body of the person to be operated on." The points of contact of the polar surfaces with the body should "be made wet "with salt water."

[Printed, 6d. Drawing.]

A.D. 1861, March 21.—N° 710.

ANDREWS, William.—"Improvements in insulators for telegraph wires."

The essential part of this invention is "the interposing a gutter "or ditch fitted with a cover between the wire and the stem rod "or other instrument which carries the insulator."

According to one method of carrying out this invention, the wire is supported at the upper part of a bell-shaped insulator, which is attached at its lower part to the arm or bracket by means of the ordinary iron stem or rod cemented into the cup of the insulator; the gutter or ditch is formed all round the point of support of the wire, and a cover is placed over it.

When the wire is suspended from the lower part of the insulator, the gutter or ditch is made round the rod which is cemented to the insulator at its upper part, and which supports it from the arm.

In adapting this principle to the ordinary bell-shaped insulator that carries the wire at its upper part, the uncemented end of the bolt is passed through "a hole in a centre piece of porcelain or "other material surrounded by a ditch," so that the top of the rim of the ditch clears the top insulator.

"An inverted funnel-shaped piece of metal (sharp at bottom, "to be driven into the wood of the arm) or of other material" may be passed round the iron supporting bolt of the insulator Holes may bored in the arm as described in N° 2548 (A.D. 1860), and an insulating substance poured round the bolt.

Insulated bolts and covers of wood boiled in oil may be used to carry out the purposes of this invention.

[Printed, 10d. Drawing.]

A.D. 1861, March 21.—N° 712.

TAYLOR, Charles, the younger.—(*Provisional Protection only.*) "An improved method of enabling the guard or other person "to communicate with the engine driver, or vice versâ, in railway "carriages, or railway trains, or similar conveyances by means of "electricity."

The source of electric power is placed "in the guard's carriage "or other convenient part or portion of a railway train," and a current of electricity is transmitted therefrom, by means of suitable conductors, to "a signal or series of signals in the "engine driver's compartment." The signals may consist of "causing a fire-arm to explode, a whistle to sound," or a bell to ring; the electric light, a shock through a driver's person, a dial index, rheometer, or needle telegraph may be used as the means of communication. These signals are to be produced "either by "causing ignition acting on a galvanometer, converting a piece "of soft iron into a temporary magnet or other mode of electrical "action."

"The electrical connection of the railway carriages one with "another" is effected "by means of conductors attached to each "carriage, and connected with each other either under the "carriage, by the side thereof, or elsewhere as may be found "most convenient, and so connected by means of screws, simple "sockets, hook and eye, or such other means as may be found "most practical or convenient, that they may be united or dis-"united at once whenever it may be necessary to attach or "disconnect one or more carriages to or from the rest." The existing connections between railway carriages may be utilized as conductors.

The engine driver, by means of a battery, may actuate a signal in the guard's compartment of the train.

[Printed, 4d. No Drawings.]

A.D. 1861, March 23.—N° 734.

HENLEY, WILLIAM THOMAS.—" Improvements in electric " telegraphs and in apparatus connected therewith."

1st. " An improved method of reversing the battery current" that actuates an alphabetical step-by-step telegraph instrument, and "a new form of apparatus for propelling the hand of " pointer on the dial."

The principal feature of the sending apparatus or commutator is that it has " no non-conducting material for the springs to rub " over." A wheel commutator is described and shown, which consists of "two toothed wheels clamped together, but insulated " from each other;" they " move round together on the fixed " stud" which forms the centre of motion of the instrument; two springs, pressing respectively on the periphery of the wheels, are connected to the telegraphic circuit, and the battery is connected with the centre stud and with a spring rubbing on the lower wheel. The above-mentioned toothed wheels are crown wheels, but another commutator is described and shown in which a spur wheel is placed between the two above-mentioned wheels; " the teeth of the central wheel project between the " others" and serve to complete a short circuit for receiving, and to break contact with the battery at the receiving station, " this " takes place between every letter." A lever reversing key, with metallic projections that rub against springs, and which has "no non-conducting material for the springs to rub over," is also set forth.

In the receiving apparatus, an escape wheel on the axis of the pointer is propelled by means of a magnetic lever with a soft iron cross piece, the said cross piece being acted upon by the electro-magnet which is excited by the currents from the above-described sending apparatus. Each pole of the electro-magnet is fitted with a "horn" of soft iron, and the soft iron cross piece is made to vibrate between the horns, according to the direction of the electric currents in the telegraphic circuit. The sending and receiving apparatus may be combined in one instrument, one dial being used both for receiving and sending.

A relay, "Morse instrument," and telephone with the above-mentioned electro-magnetic arrangements are set forth.

2nd. Magneto-electric machines. In a magneto-electric machine "to work the dial apparatus of the alphabetical telegraph,

"before described," the coiled temporary magnet is placed between the poles of the permanent magnet, and at right angles to the said permanent magnet, so that a disc, carrying soft iron pieces oscillated in front of the temporary magnet, will face the side of the permanent magnet, and so disturb the magnetic condition of the soft iron core of the temporary magnet as to produce the alternate currents requisite to work the above-mentioned dial apparatus. Either a wheel, pinion, crank, and connecting rod, or a wave-line wheel may be used to cause the rotation of a handle to impart the oscillating motion to the curved soft iron pieces. In a lever magneto-electric machine "for working a Morse or "other telegraph," two permanent magnets and two coiled temporary magnets (mounted as described above) are used, and the disc carrying the soft iron pieces is placed "between the two "magnets." In both these instruments the axis of motion is between the coiled temporary magnets and parallel to their cores. In a magneto-electric machine, described in No. 2769 (A.D. 1856), the polar faces of the coiled temporary magnets are in the same plane as the polar faces of the permanent magnets, instead of being at right angles thereto as in the above-described machines.

3rd. The use of embossed paper in conjunction with a magneto-electric current to transmit telegraphic messages. The paper is used to interrupt the current, and presents "the same surface "only on a larger scale as that on which a message has been "received in an embossing Morse." According to the position of the magnetic lever of the receiving instrument, the interruption of the current may be made to produce either a blank or a continued mark, the normal condition of the apparatus being to produce a succession of dots. A metallic ribbon or roller marked with varnish may be used instead of the embossed paper. In N° 2846 (A.D. 1853) the inventor proposed "to use a magneto-"electric current in conjunction with moveable metal type" for transmitting telegraphic messages, and "to short circuit such "currents as were not required to pass through the wire in order "to make the requisite marks on the paper."

4th. A ship's log that registers the relative speed of the vessel and of the electric telegraph cable running out. Instead of being actuated by the wheelwork, the electric break piece is in a separate air-tight chamber, and is worked by means of magnetism. A permanent magnet, that is free to vibrate on an axis in the air-

tight chamber, makes electric contact with an insulated stud every time a second permanent magnet (also mounted upon an axis) is mechanically deflected by the action of the wheelwork. An improved indicator has "two hands or indexes, one indicates the "speed of the ship on the graduator" [graduated?] "circle by "the electric current from the log, the other is actuated by another "current from a break attached either to the paying-out machine "or the sheave over which the cable passes at the stern."

5th. An electric sounding apparatus. The apparatus carried at the extremity of the sounding line consists of a permanent magnet "wound with insulated wire connected with the conductor in the "centre of the sounding line, the latter having a break in the "continuity." A bar affixed to the permanent magnet carries certain iron arms and cup forceps; "the former are held in con-"tact with the poles of the magnet by its attraction, keeping the "cups extended until they touch the bottom," when the continuity of the conducting wire is restored "by the contraction of the "spiral encased between the coats of the insulated covering." The sounding line passes from a drum over a measuring wheel whose axis carries an electric commutator or break, and at each rotation of the measuring wheel (equal to one fathom of line) a current is sent to the indicator during the descent of the line; when, however, the electric circuit is complete through the sounding line by the arrival of the permanent magnet at the bottom of the sea, the electric current reverses the polarity of the electro-magnet and causes the forceps to close upon any soil that may be loose at the bottom, at the same time the electric circuit being permanently complete, and subject to no intermissions, the electro-magnet of the indicator holds its keeper permanently in one position, and prevents the further action of the pointer of the said indicating apparatus. The weight of the apparatus at the extremity of the sounding line causes the interruption of the electric circuit round the permanent magnet during the descent of the line, but, the weight being taken off the sounding line when the bottom is reached, the contraction of the above-mentioned "spiral" takes place.

6th. Posts, insulators, &c. Four long taper sheets of iron are rivetted together at the longitudinal edges and fixed upon a cast-iron foot to form the post. In the insulators, "the bell and the "sharp edges, as made in the ordinary shackle insulator, are "combined;" in attaching one of them to the post, the flattened

end of its iron pin is bolted to the rib of the post. In a lightning conductor of improved form, one or more insulated star wheels are fixed within a ring of metal; the star wheels are connected with the line wires respectively, and the ring with the earth.

7th. Regulating trains of wheelwork. A permanent bar magnet is attached, by a connecting rod and crank, to the train of wheelwork, and is capable of rising and falling within a hollow electro-dynamic coil. The controlling train carries a commutator, and the alternate currents thus made to circulate in the above-mentioned helix or coil tend to equalize the speed of the two trains.

[Printed, 2s. 2d. Drawings.]

A.D. 1861, March 25.—N° 748.

MORGAN, John, JAY, Alfred Thomas, EDWARDS, Edmund, and TILSTON, Joseph.—The title of this invention is "Improvements in ropes or cables for submarine or other electric "telegraphs, and for the rigging of ships and other purposes."

The inventors state:—"This invention consists in the arrange-"ment of a spiral coil of wire or ribbon," "composed of iron or "other metal within a covering of rope," "composed of vegetable "fibre, metallic wires, or metallic ribbons, in such a manner that "the stretch of the rope longitudinally is prevented by the resist-"ance of the internal coiled wire to a transverse strain. In electric "telegraph cables for submarine and other purposes we take a "conducting ribbon or wire" "of copper or other metal, coiled "spirally, or corrugated or bent in such a manner as to allow it "to stretch longitudinally to a considerable extent without frac-"ture, and we insulate this ribbon or wire by surrounding it "with one or more coatings" "of pure india-rubber or other "elastic insulating material, and we place the ribbon or wire thus "insulated within the spiral metallic wire covered by the rope of "vegetable fibre, metallic wires, or metallic ribbons, above de-"scribed.

"The insulated conducting ribbon or wire is thus prevented "from injury through any transverse strain by the spiral coil of "wire" "which surrounds it, whilst the greater part of any lon-"gitudinal strain is borne by the rope" "of vegetable fibre,

" metallic wires, or metallic ribbons which surrounds the coil of " spiral wire, and the combination of parts described allows great " flexibility in the cable."

[Printed, 8d. Drawing.]

A.D. 1861, March 25.—N° 753.

CHATTERTON, John, and SMITH, Willoughby.—The title of this invention is "Improvements in submarine telegraph " cables."

The inventors state:—"The object of this invention is to pre- " vent the oxidation and decay of the metal shield or protecting " wires which surround the insulated conducting wire or wires, " and to add to the strength and durability of the cable."

"Our invention consists in coating each wire or strand of " wires of which the shield or outer casing of telegraph cables is " formed with an adhesive material or composition, such, for " instance, as gutta percha mixed with Stockholm tar and resin, " as described in the Specification of Letters Patent granted to " Willoughby Smith, 9th August 1858, No. 1811, on or into " which we lay yarns, cords, threads, tapes, or ribbons formed of " fibrous material, and this by preference in a line parallel with " the wire, though they may be otherwise laid. And in the case of " tapes and ribbons we prefer to lay them spirally. We sometimes " saturate the yarns, cords, tapes, threads, or ribbons (before laying " them) in tar or adhesive composition; we then apply one or more " coats of gutta percha or its compounds, or of caoutchouc " or its compounds, or of marine glue, or other suitable water- " proof compound or substance. In some cases before applying " the coats of gutta percha or caoutchouc, we lay on another " coat of adhesive material, but in all cases the outside coat is " formed of gutta percha or its compounds, or caoutchouc or its " compounds, or of marine glue, or other suitable waterproof com- " pound or substance."

" Our invention also consists in some cases in substituting for " the yarns, cords, tapes, or ribbons a coating composed of fibrous " material mixed with an adhesive material or composition."

N° 883 (A.D. 1858) is alluded to in this Specification.

[Printed, 4d. No Drawings.]

A.D. 1861, March 30.—N° 791.

EHRENBERG, Carl Adolph.—(*Provisional Protection only.*) The title of this invention is "Improvements in the construction "of ships' compasses."

The inventor states:—"The object of this invention is to neu-"tralise the effect of local attraction upon ships' compasses, "particularly upon those fitted in iron ships. To this end I em-"ploy a compound magnetic needle composed of two short needles "connected together by a strip of copper, the needles being on "opposite sides of the needle cap, and the north pole of one being "opposite to the south pole of the other needle. In addition to "this compound needle, which will tend to neutralise antagonistic "magnetic forces, I form the bowl of the compass of copper and "cover it at bottom with zinc, relying on the moisture of the "atmosphere to create by the contact of these metals a feeble "electric current which will in a measure isolate the needle from "the influence of bodies calculated to induce local attraction. "The further to attain the end in view, I enclose the compass in "a wooden box composed of two thicknesses of wood, between "which a layer or coating of gutta percha or other good non-"conductor is placed, and by these means I produce a compass "which will be comparatively unaffected by local attraction."

[Printed, 4d. No Drawings.]

A.D. 1861, April 1.—N° 800.

SEARLE, Richard.—"Improvements in the manufacture and "insulation of telegraph cables and telegraph wires in general, "and of apparatus for laying marine telegraph cables."

1st. "Insulating the corrugated or grooved wires," described in N° 785 (A.D. 1859). The insulating coatings or layers succeed each other in the following order:—Beads of glass and India-rubber are threaded alternately on to the corrugated wire; a covering of India-rubber is succeeded by another layer of non-conducting beads; the outer coating consists of "fibrous material made up "with bitumen." Corrugated or grooved telegraph conductors, to be used on shore, are covered with "tubes or beads of glass or "other material with or without discs or washers of india-rubber "or gutta percha."

2nd. "Improvements in apparatus for paying out or laying "marine telegraph cables." "Passing such cable, during the

" process of laying or paying out, through a flexible tube of " india-rubber or other elastic material of any desired length, " the diameter of such tube being so regulated that a gentle " and uniform pressure or resistance to the passage of the cable " is secured, and which may be increased to any desirable extent " while being paid out, thereby relieving it from a portion of " the strain to which it is subjected when paid out or laid by " the methods at present in use."

[Printed, 4d. No Drawings.]

A.D. 1861, April 6.—N° 852.

KNIGHT, James.—(*Provisional Protection only.*) The title of this invention is " Improvements in the manufacture of baths " and trays, and other vessels for photographic purposes, which " improvements are also applicable in the manufacture of galvanic " battery and other galvanic chambers or cells, and other vessels " to contain chemical solutions."

The inventor states :—" Baths, trays, and other vessels for " photographic uses, as also for galvanic battery and other gal- " vanic chambers or cells and vessels for other chemical solutions, " are now commonly made of gutta percha. But in addition to " the cost of the material, vessels made entirely of such material " are very liable to leak at the joints and elsewhere, and my in- " provements consist in forming such vessels of a comparatively " thin lining of gutta percha or india-rubber, or compounds " thereof, and then coating the same with layers of paper or " other fabric or material united together by means of solutions " of india-rubber, gutta percha, shellac, or other suitable adhesive " material."

" By these means economy of manufacture and increased " strength and durability are obtained."

[Printed, 4d. No Drawings.]

A.D. 1861, April 6.—N° 853.

GHISLIN, Thomas Goulston.—(*Letters Patent void for want of Final Specification.*) " Preparing, applying, and adapting cer- " tain vegetable productions called eiklonia buccinalis, proteaceæ, " juncus serratus, juncus trista, and armyllideæ, to further new " purposes of manufacture, and certain modes to effect the same."

N° 1049 (A.D. 1857) relates to the application of these plants to certain purposes, but the uses herein mentioned are new discoveries made by the inventor since that Specification was filed.

The present invention "relates to manipulating and manu-"facturing by chemical and other processes certain vegetable "productions found in and indigenous to South Africa and "elsewhere."

The inventor applies the fibres of "the fourth and fifth articles, "viz., juncus serratus (an aquatic), and certain members of "armyllideæ," "for the purposes of making mats and matting, "*insulating electric wires, coating and manufacturing electric, sub-* "*marine, and other cables*, and also for other marine purposes." The said fibres may either be used separately or mixed with other materials.

[Printed, 4*d*. No Drawings.]

A.D. 1861, April 8.—N° 858.

WILDE, Henry.—"Improvements in electro-magnetic tele-"graphs, and in apparatus connected therewith."

1st. "Improvements in the construction of mechanism for "converting the oscillatory motion of a magnetic needle into an "intermittent, rotary, or circular one, which is transferred to a "finger pointing to the letters of the alphabet, or other conven-"tional signs engraved on a fixed dial." The finger or pointer axis is distinct from the axis of the magnetic needle, and carries a spur wheel and a star wheel; another axis, parallel to the pointer axis, also carries exactly similar wheels, and the spur wheels on each axis gear together; a lever or arm projecting from the needle axis oscillates between the star wheels, and a pin at the extremity of the said arm alternately moves each star wheel; thus, for every oscillation of the needle, the pointer moves a space corresponding to half a tooth of the star wheel. In a modification of this arrangement, ratchet teeth are used instead of star teeth, and the wheels are driven by the oscillations of a curved hair spring at the extremity of the arm.

2nd. "The construction of the electro-magnetic arrangement "for propelling thec ombinations of wheelwork, before described." A number of magnetic needles are mounted upon the axis which carries the above-mentioned propelling arm; the cores of the electro-magnets that act upon the said needles project from soft

iron rectangular plates, and are disposed in two parallel rows, one row on each side of the needle axis; the polarity of the electro-magnets is alternate in the neighbouring cores of the same row, but similar in those of one row that are opposite to those of the other row, so that the pair of poles that act upon the same needle or set of needles are similar in polarity. To adjust the pointer mechanically, a disc with pins is rotated by means of a button exterior to the instrument, so as to act upon a pallet on the needle axis.

3rd. "The construction of mechanism acted upon by the " electro-magnetic arrangement, already described, for letting " off a train of wheelwork driven by a spring, and allowing an " alarum to sound. Upon either of the arbors carrying the star " and spur wheels a small cam is secured, which when driven by " the arbor raises a lever, which withdraws a detent from the fly " attached to the train, and permits a bell to sound. The lever " is prevented from coming in contact with the cam during the " sending of a message by means of a catch actuated by a button " in front of the instrument; the same action likewise serving to " prevent the wheelwork running down by means of another " catch, which comes in contact with the fly when the detent is " withdrawn."

4th. "Arranging the various parts of a step-by-step telegraph " and alarum, so as to fit the interior of a globe, the indicator " occupying one hemisphere and the alarum the other. On the " outside of the globe the button for actuating the finger by hand " constitutes the polar axis, the finger and button for winding " up the alarum being a continuation of the same straight line " constitute the equatorial axis of the globe."

5th. "The magneto-electric apparatus for generating the to-" and-fro current transmitted through the signal instrument." " Two straight bars of soft iron, having lateral projections at " each end, are screwed on to the opposite sides of a bundle of " rectilinear permanent magnets, all the lateral projections being " on one side, and enveloped with coils of insulated copper wire. " Two of these bundles of magnets are laid parallel and arranged " with their dissimilar poles and lateral projections opposite each " other. Two magnetic or soft iron bars are fixed by their centres " at right angles to an arbor, and made to vibrate between the " polar surfaces of the coiled iron armatures by hand or other " motive power for the purpose of generating the electric current;

" the coils being coupled together so as to deliver the currents " simultaneously in one direction or the other." Modifications of this arrangement are set forth, in which the number and configuration of the permanent magnets and of the armatures are involved.

6th. "The construction of mechanism for transmitting the " proper number of shocks through the indicator, and thereby " causing the finger of that instrument to stop at any letter or " sign required. Upon the top of the case containing the " magneto-electric arrangement already described, a circular dial " is fixed, round which a number of characters corresponding " with those on the indicator are engraved." A series of holes, one to each character, is ranged round the dial, and the motion of a radial arm on the pointer axis is arrested at the desired symbol by a moveable peg inserted into the corresponding hole " by the hand of the operator, which peg is withdrawn and " another inserted into another hole corresponding to the next " letter or sign required." The lower extremity of the pointer axis carries a crown wheel, by the rotation of which a pallet on the armature axis is vibrated. According to another arrangement the crown wheel is keyed on to the pointer axis immediately under the dial, and the pallet is actuated by means of levers.

7th. "Improved methods of applying the motive power re-" quired for driving the transmitting instrument, so that when " the motion of the mechanism contained in it is arrested by the " depression of a finger key, the jerk may not be communicated " to the hand or feet, which are allowed to move uniformly during " the whole of the time the instrument is operated upon, the " force being either stored up in a spiral spring while the wheels " are at rest, or converted into the heat of friction by means of " suitable pulleys or wheels."

A horizontal axis inside the instrument, is used to drive the vertical pointer axis, and to vibrate the armature axis; near the extremity of the said horizontal axis " outside the instrument, " one end of a spiral clock spring is secured, the other end being " also connected with the inside of a barrel, which works loosely " on the axis;" the driving handle is secured upon the outside of the barrel, and on its release a fixed catch drops into one of the ratchet teeth cut on the surface of the barrel, thus preventing the spring from running back. When the transmitting instrument is driven by means of friction, the driving handle is attached

to a flat split ring which is sprung over a pulley on the extremity of the horizontal axis.

The above-described mechanism may be driven by the foot instead of by the hand. The driving apparatus "is portable and "formed by mounting a small fly wheel in the centre of a base "of cast iron, and upon the shaft of which a pulley is secured, "as may be also the spring or frictional arrangement, if required, "instead of being on the instrument, in which case a small pulley "is keyed on the horizontal axis and driven by a band from the "loose pulley below, motion being communicated to the fly wheel "by means of the pedals attached to the base plate, acting "through suitable cranks or eccentrics."

[Printed, 1s. 6d. Drawings.]

A.D. 1861, April 15.—N° 924.

MILLER, Thomas.—"Improvements in the method of and "machinery for preparing India-rubber and other similar gums "for insulating telegraphic wires, and in machinery for laying or "applying strips of India-rubber and other similar gums, or "strips of fibrous or textile material on to telegraphic wires."

1st. "The mode of and machinery for the preparation of india-"rubber and similar gums for the covering of wire for telegraphic "and other purposes." India-rubber sheets or strips are cut "from blocks, in such a manner that the knife cuts or corruga-"tions" "run in a longitudinal direction, or nearly so, with the "sheet or strip."

In one machine for cutting sheets a knife is used of such a length as to cut along the block of India-rubber clear over both ends, the block being brought up against the knife by means of screws, racks, or chains; a reciprocating motion is given to the knife by means of a crank and connecting rod. Another machine has the crank shaft, connecting rod, and rectilinear knife mounted in a moveable frame which is made to traverse "in a longitudinal "line with the rubber block;" in this case the knife is much shorter than the block of India-rubber. In a third machine the knife is circular and is made to revolve, as well as to traverse from end to end of the block of India-rubber; for this purpose the knife is mounted on a flange or disc fixed on the driving shaft. The block of India-rubber is secured to the platform of the machine by means of atmospheric pressure.

One method of cutting strips of proper width consists in wrapping one or more of the above-mentioned sheets round a mandril, and placing the same "on suitable bearings in a "machine, where it is cut into strips by knives operated by self- "acting machinery;" when more sheets than one are used they are cemented together so as to form a single continuous sheet when wrapped round the mandril; the cutting machine acts on the principle of the slide lathe. Another method of forming strips consists of moulding an annular block of India-rubber by the action of a compound screw press upon a heated mould, and cutting strips therefrom by a machine in which the cutting tools are worked by separate slide rests operated by cams, the said slide rests acting at right angles to each other. The drums which receive the strips as they are cut are taken from the machine and made to rotate slowly in a drying chamber.

2nd. "Improved machinery for laying india-rubber, india- "rubber and its compounds, and similar gums, fibrous and other "materials, on the wire." One, two, or more hollow spindles is or are mounted on end, "over and concentric with each other, and "made to revolve on hollow studs or bearings, each spindle carry- "ing a disc arm or arms with a bobbin or reel and spindles in "each." The hollow spindles may be driven at different speeds. The end of the wire to be covered is passed from its drum upwards through the hollow spindle, "where, when it passes a con- "venient distance," it gets a covering or coverings of India-rubber from each bobbin in succession. The wire then passes over certain pulleys into a cistern of water and is carried upwards over guide pulleys to the winding drum. In some cases a drawing or stretching apparatus is used in connection with the reels that supply the India-rubber strips; the strip passes from the bobbin round certain rollers which "are geared together in such "a manner by a sun-and-planet motion that they draw the rubber "from each other, and stretch it at the same time sufficiently "without depending on the friction of the bobbin." When a flaw or fault takes place in the insulation, the current of an electric circuit, then completed by the water in the above-mentioned cistern, actuates "an electro-magnet or magnets attracting an "armature or armatures, which by the interposition of proper "levers, rods, or catches cause the machine to be thrown out of "gear, and sound an alarm gong or bell;" the Drawings show an "electro-meter" [galvanometer?] in the circuit of the covered

wire, which completes another and shorter circuit on the deflection of the needle, the said shorter circuit being made to include the coils of the electro-magnet. A lever is constantly bearing on the strip of India-rubber whilst it is being wound on to the wire; when the strip breaks or is run out, the lever is pushed gently forward by a spring, and another lever in connection with the striking gear of the machine stops its movement. If the covering on the wire becomes irregular, certain small pulleys centered on levers in connection with the stopping gear stop the machine.

[Printed, 4s. 2d. Drawings.]

A.D. 1861, April 18.—N° 959.

JOHNSON, JOHN HENRY (*a communication from Marco Maroin*).—(*Provisional Protection only.*) "Improvements in "electric telegraph apparatus."

"This invention relates to a modification of what is known as "the 'Morse' apparatus employed in the working of electric "telegraphs and consists in substituting for the soft iron arma-"ture (ancre) employed in the Morse apparatus an electro-magnet, "traversed by the current of the line, and placed in such a position "that its poles will be opposite to the contrary poles of the electro-"magnet to which it is opposed."

[Printed, 4d. No Drawings.]

A.D. 1861, April 20.—N° 981.

NOIROT, JEAN BAPTISTE JULES.—"An improved process for "manufacturing India-rubber pipes."

This invention "consists of a standard apparatus, which is "composed of two flatting cylinders turning towards one "another and compelling the mass being prepared and thrown "into a hopper to pass through a gauge plate with central core, "fitted beneath in such a manner that it shall be moulded & "drawn into tubes without any cementing of indefinite length, "and of any diameter required."

"For obtaining washers it suffices to section the tubes trans-"versely; for sheets I apply longitudinal draw plates, which when "smooth will yield smooth sheets, and yield grooved products "when they are formed with grooves thereon, *for telegraphic wires* "I have the wire drawn through the internal part of the mandril,

" the lower portion of which has been previously cut out. The " wire will on its passing through the lower draw plate be coated " with a layer or sheath of the gum; for billiard-table bands & " for mouldings, embossed or not, I make use of draw plates with " or without their cores and of suitable profile; when tubes are " to be vulcanized or otherwise treated, requiring a core or centre, " I manufacture them as in the manner herein described of " covering telegraph wires, that is to say, produce them on rods, " which are left within them till subsequently treated, when they " are withdrawn."

Coating telegraph wires is not mentioned in the Provisional Specification.

[Printed, 6*d*. Drawing.]

A.D. 1861, April 23.—N° 1013.

HENRY, MICHAEL (*a communication from Ernest Gabriel Baptiste Guillier*).—(*Provisional Protection only.*) " Improve- " ments in telegraphic apparatus."

" The manipulator.—At the base there is a lever through which " passes a copper axis threaded at the ends, and fitted with screws; " it is driven forward by a spring fixed to the suspending appli- " ance fitted to the base. The contacts are all of an alloy of " $\frac{7}{10}$ copper and $\frac{3}{10}$ tin; those of the base are cupped and concave. " The contact of the second lever has a threaded part separated " by a rivet from the round part which terminates of a thimble- " end shape; each contact has an orifice with a pin to regulate " the lever's play."

" The lightning conductor.—The parts are similar to those of " the manipulator, except in respect of a lever and a contact." If a storm injures the apparatus, a platinum wire, in the line-wire circuit, at one end of the lever, breaks, and allows instantaneous communication to be established with the earth.

" Alarm relay."—Besides the usual contacts for connecting the lines, this instrument has an " indicating plate," and a " vertical " rod " that is between the coils and is connected to the alarm wire. " When a current comes from the line" the vertical rod is thrown back and the alarm sounds till the " indicating plate" is raised by means of a rod.

" Screw permutator for putting any two wires into communica- " tion."—This consists of an arrangement of copper plates " on

"each side of" a table; "the back plates have countersunk "screws;" "the heads screwed quite down establish a perfect "contact."

"Inversion plates.—For six line wires this semicircular plate "has at top six screw contacts; 25 contacts quite similar receive "the four wires (wall-insulator alarm apparatus.) The line wire "may be connected by the conductor to two arms on a fixed "support at right angles to the table."

"By nine round screw chamfered contacts on the circumference "described by each conductor, and connected by copper plates "and other contacts not chamfered, with indications for establish-"ing relay communications, there may be established, by copper "plates like those described, placed above and below the table, a "communication between any two of these lines."

[Printed, 4d. No Drawings.]

A.D. 1861, April 24.—N° 1023.

GISBORNE, Frederic Newton.—(*Provisional Protection only.*) "Improvements in the construction of electric targets for "rifle and gun practice."

The front face of the metal target is studded with slightly projecting metal plates, which are electrically connected, either directly or indirectly, with one or more metal styles that mark the chemically-prepared paper of a registering apparatus near the marksman. According to one plan, when the shot strikes the target, it causes one of the metal plates to protrude a bolt at the back of the target; a wheel behind the target revolves synchronously with a metal style at the firing stand; the said wheel has a projecting point which describes circles of decreasing diameters, and which therefore successively releases and makes electrical contact with the protruded bolts, at the same time causing the metal style of the registering apparatus to mark the paper at places corresponding to the parts of the metal target struck. In another plan, there is a distinct wire to each bolt, both in the metal target and in the paper target of the registering apparatus, and whichever bolt is struck by the shot is at that instant simultaneously protruded on the metal target and on its miniature prototype in the registering apparatus.

Other means of protruding points at the back of the target, to be released, or to make instantaneous electric contact, are set

forth. Modifications of the two methods described above are also alluded to. Instead of the marks on the paper registering target being made by electro-decomposition, they may be either printed or punctured.

[Printed, 4d. No Drawings.]

A.D. 1861, May 3.—N° 1113.

ROWLAND, Owen.—(*Provisional Protection only.*) This invention is entitled "Improvements in electric telegraphs."

The inventor states:—"This invention has for its object improvements in electric telegraphs. In electric telegraphs in "which the conducting wires are suspended in the air these wires "have hitherto usually been of iron coated with zinc, these wires "are however found to perish rapidly. To avoid the inconvenience "and expense thus resulting, I, according to my invention, make "the suspended conducting wires of electric telegraphs of iron "or steel wire, coated either with a mixture of lead, antimony, "and tin, or with a mixture of lead and antimony, or with "a mixture of lead and tin. Of these three compositions, I "prefer to employ that first named, the other two how- "ever may be beneficially employed. In some cases the con- "ducting wires of electric telegraphs are supported in the air by "hanging them to strong wires strained between points, this "arrangement allowing the conducting wires to be hung in long "spans without causing injurious strain to fall on them.

"According to my invention, also, I make the supporting wires "used in such cases of iron or steel, coated as above.

"I also employ iron or steel wire coated as above, to form the "protecting sheathing or covering of telegraph cables to be laid "under water or buried in the earth."

[Printed, 4d. No Drawings.]

A.D. 1861, May 7.—N° 1147.

HIRSCH, Hermann.—(*Provisional Protection refused.*) This invention is entitled "Improvements in obtaining and applying "electricity for telegraphic and other purposes."

The inventor states:—"My invention consists in obtaining and "applying electricity from any two distinct metals, such as copper "and zinc, placed in water or moist earth, so that I can employ "the electrical currents produced therefrom without the aid of

" separate batteries, except in cases where it may be desirable to " increase or modify their power."

[Printed, 4d. No Drawings.]

A.D. 1861, May 13.—N° 1214.

BELL, Thomas (*a communication from Louis Le Chatelier*).— " Improvements in the decomposition of the compounds of alu- " minium and in coating metals with aluminium or its alloys."

This invention consists in decomposing the double chloride of aluminum and sodium by the agency of galvanic electricity, and in electro-coating metals with aluminum. "The bath is " composed of the double chloride of aluminium and sodium " in an anhydrous state, and which is kept melted at a " temperature of about three hundred and sixty degrees Fahren- " heit. The negative electrode is represented by the piece of " copper or other metal which it is intended to cover or coat with " aluminium. The soluble positive electrode may be of alumi- " nium, but there is economy in using a composition of carbon " and anhydrous alumina. This composition is compressed in a " mould of a cylindrical or other suitable form, then calcined in a " close vessel before being used. This process produces the " chloride of aluminium, with the chlorine, which is disengaged " by the action of the electric current." "The bath, instead of " being composed only of the double chloride of aluminium and " sodium, may consist of a mixture of this chloride with cryolite, " which mixture is fusible at a dull red heat.

" Cryolite alone may be used, but it has the inconvenience of " melting at a high temperature. A deposit of aluminium on " copper having been effected, if the piece be heated at a suitable " temperature, the alumina and copper combine and the " surface of the piece of metal will be converted into a bronze of " aluminium."

[Printed, 4d. No Drawings.]

A.D. 1861, May 16.—N° 1246.

GISBORNE, Frederic Newton.—" Improvements in the con- " struction of electric targets for rifle and gun practice."

The apparatus to be used to carry out this invention consists of a target, a pair of synchronous instruments (one at the target the other at the firing stand), and the recording apparatus. The

use of the synchronous instruments enables the electric current from all the plates of the target to be transmitted "through one "wire to the printing and recording instrument at the firing "stand," but the said synchronous instruments may be dispensed with by using a compound wire in the main circuit, which compound wire contains "a number of wires not less in number than "there are sections or plates in the target."

1st. The target.—The face of the target is composed of a number of plates, perfectly distinct and separate from each other and suspended from the main framing by separate centre bolts. All the plates "stand in different vertical planes," and the bolts extend back through the framing and project beyond the same. When a plate is struck by a bullet, the electric contact of a local circuit is completed by means of a metallic ball that runs loose in an inclined vulcanite tube containing the polar terminals; the ball usually rests against the extremity of the above-mentioned bolt, but the impact of the shot drives it up the tube so as to make the requisite contact. Each plate has a local circuit and inclined tube of its own.

2nd. The synchronous instruments.—

The instrument at the target consists of a number of small electro-magnets, each having its vibrating armature, and a revolving and contact-making arm. The electro-magnets are at least equal in number to the target plates, and each target plate is connected by means of a short wire rope with a particular electro-magnet. The arm is made to revolve by means of a large electro-magnet and local circuit provided for that purpose. The circuit completed by the impact of a shot causes one of the armatures to project, and when the revolving arm restores it to its place it completes the main circuit, acts through the synchronous instrument at the firing station, and causes the position of the hit to be marked on paper by the recording instrument.

The instrument at the firing stand consists of an index which revolves by means of clockwork, synchronously with the arm of the instrument at the target, over a number of studs; the number of the studs in this instrument is equal to the number of small electro-magnets in the instrument at the target, and each stud is connected to a corresponding marker in the printing machine.

3rd. The printing or recording apparatus.—A vulcanite plate carries studs or markers connected as described above, and placed in a relative position to their respective target plates against a

sheet of chemically-prepared paper. The paper is mounted upon a metallic plate properly connected with the main circuit, and, according to the stud included in the circuit at any given hit of the target, the mark on the paper is made. The paper is ruled to represent the target as it is divided into plates, and each marksman may take away a record of his own hits on one piece of paper.

[Printed, 2s. 4d. Drawings.]

A.D. 1861, May 17.—N° 1259.

TEARNE, SAMUEL.—This invention is entitled "An improve-" ment or improvements in producing designs in enamel on " articles of brass and the alloy called German silver."

The inventor states :—" My invention consists in coating with " copper the surface of the article of brass or German silver to be " enamelled, or coating with copper that portion of the surface of " the said article to which the enamel is to be applied to which " coating of copper the fused enamel attaches itself firmly.

" I carry my invention into effect in the following manner :— " I first produce a design upon the surface of the article of brass " or German silver to be ornamented by enamelling. The said " design may be produced by engraving or etching with acid " or by transferring a design printed from a copper plate, stone, " glass, steel, zinc, or other printing surface, and biting only to " the required depth those parts to be enamelled, or by embossing " the design on the surface with dies or rollers or other tools. I " then deposit a flim or layer of copper upon the whole surface " or upon those parts only to be enamelled, which coppering " may be effected *by the ordinary process of electrical deposition* as " is well understood. The enamelling of the said coated parts is " afterwards effected in the ordinary way.

" I sometimes deposit a layer of copper upon a plain piece of " brass or German silver and then float on the enamel so as to " form a back ground, and after fusion I paint or transfer " designs in vitrifiable colors or gold on to the said enamel and " fuse the said colors thereon. The articles can then be plated, " dipped, lacquered, and polished in the ordinary way."

[Printed, 4d. No Drawings.]

A.D. 1861, May 18.—N° 1273.

FITZGERALD, DESMOND GERALD.—(*Provisional Protection only.*) The title of this invention is "Improvements in obtaining "electric currents for telegraphing purposes."

The inventor states:—"In forming a voltaic series for the pur-"pose of obtaining an electric current for telegraphic purposes, I "use the earth as one of the battery cells of the arrangement; I "therefore place in electrolytic contact with the earth a positive "and a negative voltaic element at any required distance from "each other, and I employ this voltaic couple in conjunction with "an ordinary or any galvanic battery in the following manner:—"I connect the positive element in the earth with the positive "terminal of the battery, and I connect the negative element in "the earth with the negative terminal of the battery. One of "these connections is established by means of the wire through "which signals have to be transmitted. I prefer connecting the "positive element in the earth to the positive terminal of the bat-"tery. The elements in contact with the earth may be similar to "those contained in the battery cells, and similarly excited by "means of porous vessels containing the exciting fluid. I occa-"sionally employ a voltaic battery in connection with the earth "couple at both instead of at one of the stations. I claim the "use of the voltaic battery in combination with a voltaic couple "in electrolytic connection with the earth."

[Printed, 4*d*. No Drawings.]

A.D. 1861, May 18.—N° 1274.

FITZGERALD, DESMOND GERALD.—(*Provisional Protection only.*) "Improvements in batteries for producing voltaic electri-"city, together with certain metallic products."

The inventor constructs "a voltaic arrangement of the metal "iron and a metallic salt, the acid of which has a greater affinity "for iron than for the metal of the salt. The metal of the salt is "therefore precipitated or thrown down, forming a residue of "commercial value. In order to confine the deposit to one of "the plates or elements only in each separate couple, the remain-"ing plate or element is coated with a porous material or pre-"vented from being in direct contact with the exciting fluid by "means of a porous diaphragm or a porous cell. When a dia-"phragm is used a mineral acid may or may not be employed to "excite this latter plate or element. In either case the plate upon

"which the deposit does not take place becomes the positive "element of the couple; the plate upon which the deposit takes "place forming the negative element. In forming a series of "couples the positive and negative elements of each couple are "brought into metallic connection, as is well understood."

[Printed, 4d. No Drawings.]

A.D. 1861, May 18.—N° 1278.

CLARK, William (*a communication from Ludovic Guyot d'Arlincourt*).—"Improvements in electric telegraph apparatus."

The "improved writing telegraph," which is the subject of this invention, consists of a single apparatus, which serves both as manipulator and receiver. "The transmission of movement to "the different parts of this improved apparatus is effected by two "arrangements of clockwork mechanism which is governed and "regulated by electricity."

The manipulating portion of the instrument consists of a dial, round which spring finger keys are disposed. On the depression of a key the rotation of one of the clockwork mechanisms is arrested by a cam, and a prolonged current is sent through the telegraphic circuit to enable the letter to be printed. During the rotation of the central axis of the manipulator, instantaneous currents are constantly sent into the telegraphic circuit to govern the rotation of the type wheel.

The receiving portion of the instrument consists of a type wheel, inking roller, striker, type-wheel electro-magnet, and printing electro-magnet. The striker is actuated by a different clockwork mechanism to that employed to rotate the manipulating portion of the apparatus and to work the escapement of the type wheel; but the type wheel is rotated and the paper advanced by the clockwork, which is regulated by a wheel furnished with a circular groove and certain notches, in which levers act according to the position of the armature of the printing electro-magnet. The printing electro-magnet does not act until a prolonged current is established at the sending station.

[Printed, 1s. 4d. Drawings.]

A.D. 1861, May 25.—N° 1322.

MONCKTON, Edward Henry Cradock.—"Improvements "in obtaining and applying magnetic motive power, which in"vention is also applicable to other useful purposes."

In the Final Specification this invention is said to consist "in obtaining and employing electric currents" in a certain manner and for definite purposes.

1st. Motive power. In obtaining motive power, pieces of iron are so introduced, in succession, between the acting magnets, as to produce motion in such of the said magnets as are capable of rotation. In the Final Specification "electric currents" are said "to be diverged" by the introduction of pieces of "pure soft "iron."

2nd. Manufacture of magnets. "Casting fused steel into "suitable moulds and then hardening magnetising, and pre- "paring the same in like manner to the common magnet."

In the Provisional Specification the 2nd head of the invention is stated to be "having two magnets, or a magnet and a piece of "iron or other similar para-magnetic medium so placed as to "rotate past the centres of each other's attraction by means of "their own momentum acquired by mutual attraction, the attrac- "tion being taken up by other rotating attracting mediums, and "thus causing a continued rotatory motion."

3rd. "Communicating the magnetic power to hardened steel pre- "pared as aforesaid, or otherwise, of various shapes so as to "render it uniformly magnetic, as also magnetic in a compound "manner, by placing a ring of hardened steel before the poles of "a powerful electro or other magnet, the said ring being placed "vertically, and the magnet horizontally, in which position either "the ring or magnet is caused to revolve till the former is "sufficiently charged; it should then be withdrawn in a straight "line, still keeping up the revolution and observing the same "relative positions."

The 3rd head of the invention in the Provisional Specification is "having magnets and iron, or other mediums for magnetic "purposes generally plated or coated with gold, silver, or other "suitable substance to protect them from the atmosphere, or "otherwise."

4th. "Tapering the ends or poles of magnets in order to con- "centrate their magnetism."

5th. "The employment of tapered magnets for the production of "motive power or where intense magnetism is required for other "purposes."

6th. "The employment of electric currents induced by the "aforesaid means for other useful purposes, such as lighting,

"heating, propulsion, electro-plating, telegraphing, the cure of "disease, the production of chemical compositions and decom-"positions, protection of property, and to the arts and sciences "generally." These points are also mentioned in the Provisional Specification.

7th. "The combination of any or all of the aforesaid principles "with or without the use of galvanic batteries, for the above-"mentioned or other useful purposes."

The 4th, 5th, and 7th heads of this invention are not specifically alluded to in the Provisional Specification.

[Printed, 4d. No Drawings.]

A.D. 1861, May 27.—N° 1329.

DUNCAN, Charles Stewart.—"Improvements in construc-"tion of electric telegraph cables or ropes."

"Cane of every denomination" is laid round the insulated conductor so as to completely cover and protect the same.

The cane may be "intermixed with coir fibre, hemp, or other "suitable fibrous material plaited or twisted together, or other-"wise, and applied to the conducting wire or wires either before "or after insulation."

In some instances the interior fibre or core of the cane is laid on a setting or bedding of yarn hemp, the said interior fibre being saturated with "a preparation of oak bark, terra japonica, and "mammosa or sea squill tan combined with tar water."

The "cane, hemp, or other fibrous material" may be combined with steel, iron, or other suitable metallic wire.

A dovetail, scarf, or other suitable joint is used to splice the cane, causing the joints to adhere by means of marine glue, and binding the said joint with copper wire coiled transversely. This method "is also especially applicable to the purpose of giving "sufficient gravitation, and causing the cane to descend to the "bottom of the sea in an even and horizontal position; in all "cases first taking care to break joint."

"To prevent the untwisting, looping, or what is known as "'kinking' of the cable, or opening up of the cane or outside "cover," the inventor binds "the cable with hempen cord, or "any other such like fibrous cord of adequate strength, or wire, "or strips or sections of cane, either transversely or spirally."

[Printed, 4d. No Drawings.]

A.D. 1861, May 29.—N° 1341.

MONCKTON, Edward Henry Cradock. — (*Provisional Protection only.*) " Obtaining and applying magnetic motive " power."

This invention " has reference to cutting off or diverging mag- " netic attraction at certain points for the purpose of obtaining " motive power, and consists, firstly, in the application of galvanic " or electric currents conveyed by wire into contact with magnets " or other mediums (insulated or otherwise) attracting each other. " And, secondly, in lieu thereof, in the direct application to the " poles of magnets or other mediums, insulated or otherwise, of " pieces of iron or other similar paramagnetic mediums (such as " nickel, peroxide of lead, red lead, or otherwise), whether simple, " compound, or chemically prepared.

" To obtain a rotatory or reciprocating motion by the action of " magnets or other mediums," the inventor causes " the magnets " to be placed on the periphery of a wheel, or attached to a frame " so as to attract and be attracted in their turn by other magnets " in a fixed position, these magnets or other media having their " attraction cut off or diverged by the above applications in such " manner as to admit of other magnets being successively brought " into their sphere of attraction, whereby a rotatory or other " motion is produced, the magnets, iron, or other media being " protected from the action of the atmosphere or otherwise by " means of electro-plating, or by coating them with any suitable " substance for that purpose."

[Printed, 4*d*. No Drawings.]

A.D. 1861, May 30.—N° 1350.

JOHNSON, John Henry (*a communication from Henri Girond*).—" Improvements in apparatus for regulating the pres- " sure of gas."

Two separate apparatus work " in conjunction with each other," one being situated where the gas is used, the other where it is manufactured. " The first-mentioned piece of apparatus consists " of a float or pressure guage or indicator," the needles of which are so constructed that they can establish an electric communication with the second piece of apparatus at the gas works " when- " ever the pressure varies in the slightest degree from its regulated " or desired amount." " The second piece of apparatus placed

" at the gas works consists of a hydraulic valve or regulator " placed on the mouth of the main, which conducts the gas from " the gas-holder, such valve being opened or closed by an " arrangement of wheelwork actuated by a weight and double " gearing." Two electro-magnets "are so adjusted in the ap- " paratus as to act upon the starting or reversing lever of the " wheelwork, and according as one or the other of these magnets " is excited, the lever will be brought into two opposite positions, " or will remain in a central position when both magnets are un- " excited, and the valve will be either elevated, depressed, or " held stationary accordingly."

The Drawings show a permanent magnet at the extremity of the starting or reversing lever, the said permanent magnet being acted upon by the electro-magnet according to the direction of the current that excites the said electro-magnet.

Besides the above-described apparatus, a small " return pipe" to the gas manufactory may be used. If the "return pipe" is of sufficient diameter, the " wheelwork or gearing and the electric " current may be both dispensed with."

[Printed, 1s. 2d. Drawings.]

A.D. 1861, June 1.—N° 1378.

GISBORNE, Frederic Newton.—" Improvements in the " means of and apparatus for indicating the course to be steered " in ships at sea, and in galvanic batteries to be used in some " cases therewith."

1st. Electrical apparatus to form the means of communication between the look-out officer forward and the steersman abaft, and vice-versâ.

A box or signal instrument is placed near the steersman, " in " which are two or more electro-magnets so arranged that they " act at pleasure upon certain moveable slides or lids. Beneath " those slides or lids are glass panels coloured green, red or " other suitable color, and whereon 'port,' 'hard-a-port,' 'star- " 'board,' 'hard-a-starboard,' 'steady,' or other terms are painted " or impressed. A lamp placed in the box at night-time reflects " the signals in colour and words. In the same circuit with the " electro-magnets is an alarm bell."

The apparatus for communicating the signals is placed at the bow or paddle-box of the vessel; it consists of an arm capable of being placed over any one of several studs so as to connect the

battery with the electro-magnet required; the arm moves on a centre and the studs are placed in the arc of a circle.

The stearsman signals in return that he has received and understands his command by pressing his foot upon a block, in accordance with his position, and thus completing an electric circuit, whose direction corresponds with the block or cushion which is depressed. This action operates a galvanometer indicator and deflects a shutter; the direction of the deflection depends upon the direction of the current.

Cords and pulleys may be used, instead of electro-magnetism to work the shutters of the signalling apparatus.

2nd. "A novel construction of battery to generate the electricity whereby the electrical apparatus above referred to may be worked." An ebonite cylinder "is fitted with air-tight end coverings, in which the terminals are so placed as to close the tube when screwed into the poles of the battery. Electric action is attained by coiling copper wire round zinc plates placed upon a wood centre, and with brown paper, or other substance suitable for retaining moisture, between the metals."

[Printed, 1s. 10d. Drawings.]

A.D. 1861, June 4.—N° 1406.

ROEBER, Heinrich Gottlieb Bernhard.—(*Provisional Protection only.*) "Improvements in the manufacture of insulators for telegraphic wires, and in materials and machinery for coating telegraphic wires."

1st. Insulators.—In the manufacture of insulators "two or more materials differently acted on by changes in the atmosphere" are employed. When India-rubber and porcelain are the materials used, a metal rod of "a swan-neck" shape is coated with India-rubber, and "to the bill of the neck" is connected a piece of porcelain on which the line wire rests.

2nd. Coating telegraphic wires.—The wire is coated "with india-rubber or its compounds, in combination with sulphurets, sulphates, and oxides of metals together or separately." To apply the coating "spirally" a double rotary motion is imparted to the wire, "one about is own axis and another round the circumference of a cylinder or cone;" "the wire is drawn forward, and is coated as it advances by india-rubber led from a bobbin or bobbins." To coat wire longitudinally, a series of grooved rollers are employed, "each containing two or more grooves ac-

" cording to the number of wires to be coated." " As soon as " the covered wires leave the rollers, revolving or fixed knives " divide them one from the other." By the arrangement described the inventor is enabled "to coat any number of wires " with as many coats as may be required in one and the same ma- " chine," and at the same time waste in the insulating materials is prevented.

[Printed, 4d. No Drawings.]

A.D. 1861, June 7.—N° 1443.

BALSAC, HYPPOLITE AUGUSTE.—(*Provisional Protection only.*) " An improved electro-thermometrical alarum."

" The invention relates to an improved alarum for indicating " fires or other accidents or purposes by which an increase in " temperature takes place so as to act on a thermometer con- " nected with the alarum, the latter being set in motion at a " suitable degree of heat by means of this thermometer, and by " the electric current of a galvanic battery."

" For this purpose a mercury thermometer is made use of, in " the upper part of the glass tube of which a platinum wire is in- " troduced, the lower end of which may, by a set screw or other " suitable means, be set at the required distance apart from the " level of the mercury, in such manner that whenever the increase " of temperature causes the mercury to rise sufficiently for coming " in direct contact with the platinum wire, the electric current " being formed, the alarum interposed in this circuit will be " caused to act; the above-mentioned set screw is at one end in " metallic contact with the platinum wire, and at the other end " with one of the pole wires of a suitable galvanic battery, while " the other pole wire of this latter is connected with another " platinum wire passing air-tight through the lower part of the " thermometer so as to be there constantly in metallic contact " with the mercury. Any alarum worked by an electric current " may be made use of " for the inventor's purpose, " when pro- " perly interposed in the electric circuit."

[Printed, 4d. No Drawings.]

A.D. 1861, June 8.—N° 1469.

CLARK, WILLIAM (*a communication from Louis Désiré Trannin*).—" Improvements in constructing casks, tubs, & other " like ssels, whereb to render them water-tight."

The said vessels are coated "either on the interior or exterior "with thin sheet metal. These vessels may be made of any kind "of wood, and the parts or staves united by dowels tongued and "grooved, or in any other suitable way." "The sides and ends "are then coated with metal, either by means of the *galvano-"plastic process*, or with a brush; they may also be lined on the "interior with a thin coating of tin, or other metal, which is "caused to adhere strongly to the sides by means of glue or other "material to cause adhesion."

The Drawings show various configurations of "ligno-metallic" casks and of their constituent parts.

"An electric pile" is said to be used in metallizing wooden casks "by means of galvanoplasty."

"The system herein-before described offers this advantage, that "casks may lose their hoops without fear, as although they "become disengaged from any cause the liquid contained cannot "escape, as the staves form but one substance of the containing "vessel. Corks used in bottles and jars," as well as the plugs and bungs of the casks may be made impervious "by coating "them with metal."

Seven methods, comprised in this invention, of rendering casks water-tight, are enumerated.

[Printed, 8*d*. Drawing.]

A.D. 1861, June 10.—N° 1484.

VARLEY, Cromwell Fleetwood.—(*Provisional Protection only.*) "Improvements in electric telegraphs."

1st. Improvements in galvanic batteries. A modification of the inventor's "gravity battery" described in N° 2555 (A.D. 1854), consists of a tube containing the negative salt, placed inside a shallow metallic tray, "the bottom of which is generally "extended to cover the bottom of the cell;" the said tube "has "one or more openings near its lower end to let the dissolved salt "into the shallow tray." "The positive metal is suspended in "any convenient manner over the negative metal, and in the "fluid. The tube exposes only a limited portion of negative salt "to the fluid, and thus checks its solution." The above-mentioned tray may be placed "in one or more trays, which are "electrically connected." "If the negative solution fill the first "tray it will overflow, and the outside of this tray and the lower

" plate will then come into action, and consume part of it when-
" ever the battery is at work."

2nd. " Preventing the escape of the electric force from the con-
" ducting wires." The inventor uses "very small insulators,
" reducing the diameter of the insulating portions as much as
" possible, and giving the insulator always two chances. By
" using a steel, iron, or other suitable pin entirely covered with
" vulcanized caoutchouc, vulcanite, or ebonite, if one end be
" imperfect, the other prevents the electricity from escaping."
These pins are again partially covered " with wood, glass, porce-
" lain, earthenware, vulcanite or other caps."

[Printed, 4d. No Drawings.]

A.D. 1861, June 11.—N° 1496.

SINGER, SAMUEL BERRY.—This invention is entitled "An im-
" provement in the card of compasses," and it relates to the
mariners' compass.

This invention " consists in forming or coloring the surface of
" one half of the card of a black or dark color or shade, and in
" forming or making the surface of the remaining half of a white
" or light color, for the purpose of enabling the compass to be
" read in dark and foggy weather without artifical light, by night
" as well as by day."

The inventor makes the above-mentioned compass cards of
mother-of-pearl, and indicates " the several points thereon much in
" the ordinary way," but in addition, he colours " about one half
" of the card of the dark or black color," and leaves "the other
" half exposed and showing the whole of the mother of pearl,
" which enables the compass to be read at all times when there is
" the least ray of light, and a steersman to direct a ship's course
" thereby at night without the use of an artificial light, except on
" very rare occasions." This " improved compass card may be
" made of other material, either in themselves possessing, or
" combined, to form the black and white combination before-
" mentioned, or may be colored to produce the different effects."

[Printed, 6d. Drawing.]

A.D. 1861, June 12.—N° 1503.

CALLAUD, JEAN ARMAND.—" Improvements in the con-
" struction of electrical piles " [galvanic batteries ?].

The chief object of this invention is to dispense with the porous cell in Daniell's and other galvanic batteries.

In a Daniell's battery, constructed according to this invention, the sulphate of copper solution occupies the lower portion of the vessel, and is only separated from the zinc solution above it by means of its superior density. Various means of supplying crystals of the sulphate to the lower part of the vessel are described in the Specification and shown in the Drawings; in one instance a funnel reaching to the upper part of the liquid and dipping into the lower liquid is used; in another instance the negative plate is formed so as to receive crystals by dropping them into the liquid; and in a third instance a vertical partition extending nearly to the bottom of the vessel is employed. The metals are supported in their respective liquids, either by binding screws, that pass water-tight through the sides of the vessel, or by supports in the vessel, or by hanging from the top of the vessel.

In a Bunsen's battery, constructed according to this invention, the zinc solution is composed of a mixture of sulphate of zinc solution and sulphuric acid, and is placed in the lower part of the vessel; the nitric acid is then carefully poured on to the zinc solution.

A vessel containing the battery solution, and the solution and fittings for electro-deposition, is also described and shown.

Sulphate of protoxide of mercury, with a carbon negative plate in it, may be used in the lower part of the vessel.

[Printed, 1s. Drawings.]

A.D. 1861, June 12.—N° 1512.

JOBSON, Robert, and VARLEY, Cromwell Fleetwood.—" Improvements in posts or supports for telegraph wires."

Conical lengths of cast-iron tubes are made to fit together with suitable joints, to form the portion of the post which is above ground, the smaller end of the post being upwards. The portion of the post which is embedded in the earth is also made conical, with the smaller end downwards; " to prevent it sinking in soft " land the base may be made to rest in or upon a disc or inverted " dish." " Where the parts of a metal telegraph post or support " are made to fit together with sockets," " in order to prevent the " parts pulling apart when the post or support is in use," a wire

is passed up "the interior of the post or support, attaching it at "one end to the base, and at the other end to the upper section "of the post or support."

The above-mentioned posts may be stayed with wire stays "passing to the base of the post or support, or to parts projecting "from the post or support." Two sets of stays are usually employed, "one set to steady the post or support near its centre, "and the other set to steady its upper end, or a greater number "of sets of stays may be employed."

In place of galvanizing metal telegraph posts, they are dipped "into hot or boiling drying oil, which produces a varnish-like "surface on the metal, over which paint may be applied if "desired."

[Printed, 10d. Drawing.]

A.D. 1861, June 15.—N° 1539.

POTTS, FERDINAND.—"Certain improvements in the manufac-"ture of metallic posts for supporting telegraph wires, and which "said improvements are also applicable for other purposes."

This invention consists in constructing telegraph posts "of "sheet iron of a taper form, and of any desired shape in their "transverse section." The segments of which the said posts are constructed are cut out from sheet iron as described in N° 2138 (A.D. 1853); the parts are shaped "by pressure with "the iron in a hot or cold state as desired," or they may be drawn, "as far as practicable, through a common or expanding "hole at a draw bench." "When shaped and put together," they are secured "by rings shrunk on hot or otherwise." "The "taper tubular post thus formed" is united "to a broad cast-"iron or other formed base, with a screw or other suitable means "for screwing or securing it in the ground." These telegraph posts may be galvanized or enamelled. In some cases the rings may be formed "with projections or flanges, for the purpose of "attaching tension rods, which may be secured to the base before "described, or extended to other suitable bases in connection "with them, or otherwise as desired." If posts thus constructed are "used for supports for fencing, the rings may be formed at "the ends of rails, so that by dropping on the rails, and striking "down in position, the parts or segments forming the posts will "be held secure, and a continuous fence may be formed."

[Printed, 10d. Drawing.]

A.D. 1861, June 17.—N° 1545.

WHITE, David Blair.—" Improvements in plummets and " gauges for indicating the depth and the height or level of " liquids."

This invention " is more particularly intended to indicate on " shipboard the height or depth of water that may have leaked " into or otherwise entered the hold, but it is applicable to indi- " cating the depth and the height or level of liquids generally."

A wire from one pole of a galvanic battery " leads to a needle " or series of needles or indicators, while communication is " established to complete the electric circuit by means of a float, " or, in the case of salt water and other good conducting liquids, " by the water itself rising and coming in contact with one or " other of a set of metal plates placed one over another, and each " having connected to it a separate wire leading to the indicating " apparatus. The plates being at different levels, the indicating " apparatus shows which plate is in communication, and conse- " quently the height of the liquid; or two plates each connected " with a separate pole and placed close together with one indi- " cating needle may serve the greater or lesser depth of fluid " increasing or diminishing the acting surface of the plates, and " deflecting the needle accordingly."

In an arrangement for sounding, " a piston or ram influenced " by the pressure of the water acts upon plates connected with " the battery by the wires through the line, and gives indications " as in the before-mentioned."

One apparatus shown in the Drawings consists of a number of metal plates fixed to a wooden rod; another apparatus consists of a cylinder (containing insulated metal plates) in which a ram or piston is free to move.

[Printed, 10*d*. Drawing.]

A.D. 1861, June 18.—N° 1554.

BANKS, James.—(*Provisional Protection only.*) " Improve- " ments in electro-magnetic telegraph printing apparatus or " marking instruments."

" This invention consists in certain novel arrangements of " electro-magnetic apparatus, by which the needle or style used " for producing certain marks, indentations, indications, or " signals in the shape of dots and lines upon ribbons or slips of

" paper is made to operate direct and rapidly with the minimum " of power."

The needle or style is made "one of the terminations of a soft " iron core," which is supported "in suitable bearing pieces or " 'cocks,' " so as to "allow of its freely running back and forth " within an electro-magnetic coil, along the axial line thereof;" a spring is attached "to the opposite end of the soft iron bar," so as to keep the core "in its proper position when the electric " current ceases to pass."

The motion of the said soft iron core, by the repulsion of the electro-dynamic coil, is further aided by a permanent magnet, which, being of an opposite polarity to that of the core, attracts it in the direction required to mark the paper.

In practice, a double hollow coil with a soft iron core is employed, and it is preferred to use an electro-magnet with "a " solid iron pole" instead of the above-mentioned permanent magnet.

"Any convenient going movement or train of wheels operated " by a spring and fuzee," is used to draw through "the paper " between gripping or friction wheels or rollers."

To mark dots and lines, the paper is pressed by the style " against an inked band or band of carbon paper." When punctures are required the paper is pressed by the needle against a suitable pad.

[Printed, 4*d*. No Drawings.]

A.D. 1861, June 18.—N° 1567.

NEWTON, WILLIAM EDWARD (*a communication from George Beardslee*).—" Improvements in electro-magnetic engines."

The invention, generally, has relation to magneto-electric machines, but the first portion of the said invention is also applicable to electro-magnetic motive power engines.

1st. Frotteur wheels or commutator wheels.—" Making the " bearing surfaces of the two conductors (which bear upon and " act in combination with a wheel composed of metallic segments " separated by insulating segments) of greater extent than each " insulating segment, so that one metallic segment shall not pass " from contact before the next comes in contact." " In this way " the evolution of sparks and all the evils consequent thereon " are entirely avoided."

2nd. Magneto-electric machines.—"Connecting the cores of a "series of spools or coils arranged in a circle by a ring of soft "malleable cast-iron, or wrought iron, or any equivalent sub"stance which possesses the property of readily taking and "discharging induced magnetism, whether the circle of spools or "coils with their cores so connected be used in connection with "rotating magnets or the circle of spools be made to rotate and "used in connection with stationary magnets, or whether the "magnets and the circle of spools or coils be both made to "rotate." By this arrangement "the said cores can act succes"sively in pairs as closed armatures," and "the rings which "connect the cores of the spools, coils, or helices can be attached "directly to a disc or wheel of cast iron, or of any other metal "which would become permanently magnetic if the cores were "attached directly to it."

[Printed, 1*s*. Drawing.]

A.D. 1861, July 16.—N° 1785.

MAPPLE, James.—(*Provisional Protection only.*) "Improve"ments in telegraphic apparatus."

"The apparatus herein-after described is intended to overcome "a difficulty which Mr. Morse found insurmountable in his "telegraph, *i.e.*, tracing the despatches in ink on a strip of paper "commonly used, which paper is carried forward by the force of "a main spring or weight turning a train of wheels, pinions, and "rollers; Mr. Morse used contrivances of various kinds, but his "efforts with this object in view failed in practice."

"This invention consists of an endless chain rotated by the "train of wheels, and in its rotation it is made to rub against an "inking roller supplied with common printing ink, and the strip "of paper is pressed against the inked surface of the chain by "the attractive force of an electro-magnet, which magnet is "common to all the Morse telegraphs, and by these means the "dispatches are traced in ink on the said strip of paper in lieu "of indentations produced by the common Morse instrument."

[Printed, 4*d*. No Drawings.]

A.D. 1861, July 16.—N° 1792.

ABEL, Charles Denton (*a communication from Henri Catherine de Roulz*).—This invention is entitled "Certain new

" alloys of silver with other metals, and the process employed in " their manufacture," and in one part of the said invention galvanic agency is used.

1st. The production of alloys of silver " with copper and nickel, " with or without the addition of manganese." Phosphorus also may be introduced into the said alloys.

2nd. "The processes employed for purifying, fusing, and alloy- " ing the constituent parts of the herein-before described alloys " of silver."

It is preferred to purify the ordinary commercial impure nickel by the following process:—" It is first dissolved in nitro-muriatic " acid, or in dilute sulphuric acid; if dissolved in the latter, the " solution must be accelerated either by the aid of a galvanic " battery or by a galvanic action obtained by contact in operating " in a platinum vessel. A current of chlorine is then passed " through the solution, the iron is precipitated by boiling with " carbonate of lime; the nickel is then precipitated by carbonate " of soda, and the precipitate is again dissolved by hydrochloric " acid. This solution is then greatly diluted with water and " saturated with chlorine gas, after which carbonate of baryta is " added in excess, and the solution is left to cool. From this the " nickel is eventually precipitated in a metallic state by means " of a galvanic current, or it is precipitated in the form of oxide, " which is reduced in the ordinary manner."

Other processes are also set forth in detail.

[Printed, 6*d*. No Drawings.]

A.D. 1861, July 17.—N° 1800.

BROOKE, SIR WILLIAM O'SHAUGHNESSY.—" Improvements " in apparatus for suspending and insulating electric telegraph " wires."

" In order that electric telegraph wires may be insulated where " they are supported, the apparatus is formed in the following " manner:—An inverted cup or hollow vessel, by preference of " cast iron, and of a rectangular form is used, the upper end of " which is closed, and has formed on it a recess suitable for " receiving and having a wire fixed therein by solder or by " clamps of hardened india-rubber, prepared wood, or other " material. The edges of the sides at their lower ends are " turned up into a trough or gutter-like form; on the interior of

" this inverted cup or hollow vessel is fixed another hollow in-" verted cup or vessel, composed of the hard compound produced " by combining india-rubber and sulphur, and submitting the " same to high temperatures. This inner cup or hollow vessel " is of like section to the outer cup or vessel above mentioned, " but of less dimensions, so as to leave a space in all directions " between the inner and outer cups or hollow vessels, and such " space is filled up with melted sulphur. This apparatus is " placed on an upright pin or support, by preference of wrought " iron, though other material may be used, and such pin or " projection is of like section to the interior of the inner in-" verted cup or vessel, but of different dimensions, so as to leave " a space in all directions between the pin or support and the " interior of the cup or vessel, which is filled with melted sulphur " The pin or support is carried by a bracket or post or other " suitable means."

[Printed, 10*d*. Drawing.]

A.D. 1861, July 18.—N° 1806.

WEST, CHARLES.—(*Provisional Protection refused.*) " Improve-" ments in the mode of insulating and covering wire."

In insulating the wire by the process set forth in the inventor's Patent of the 18th of October 1858, " only the very best South " American rubber" is used in its native state. The moisture in the India-rubber is driven off " previous to its being placed " upon the wire," thus enabling the India-rubber to be consolidated after it has been placed on the wire. This is readily accom plished " by subjecting the strips of ribbands of pure india-rubber, " after they are cut from the bottle, to a process of dessication or " evaporation. The result is that the india-rubber so treated " will, when on the wire, with the aid of solvents, unite with the " second coating of rubber, & this again with the third, & so " on." The solvents are applied " to the rubber after it leaves the " delivery drum and as it enters the mandrel," by means of " small troughs containing the solution, in each of which there is " a sponge or some fibrous material with capillary attraction. " These are placed on the ends of two rods rivetted together in the " centre, which will open and shut like a pair of scissors, so that " by closing them when the machine is in motion the wire passes " through the saturated sponges, and when it stops, by opening " them the contact with the wire ceases."

"The dessication or driving off the moisture under the present "process will prepare the rubber for consolidation by boiling," as set forth in the inventor's Patent "bearing date the 18th of "October 1858."

[Printed, 4d. No Drawings.]

A.D. 1861, July 22.—N° 1840.

NEWTON, William Edward (*a communication from Francisque Million*).—"Improvements in engines for obtaining motive "power by an explosive mixture of inflammable gases and air."

"The gases are ignited by means of an electric spark, and "upon driving forward the piston in the cylinder, will actuate the "other parts of the engine." "The gases to be employed for this "purpose are produced in a generator attached to the engine." Pumps, whose piston rods are connected to that of the working cylinder, are employed to compress the gases "before they are "supplied to the main cylinder."

The electric spark employed to ignite the gases should proceed from a condenser, which is charged by means of a modified Ruhmkorff apparatus. In this apparatus "the circuit breaker of the "battery should be set in action by some mechanism," and "a "commutator must direct the induced currents always in the same "direction to the condenser." The spark is produced "in the "motive cylinder," and the "two conducting wires enter the casing "of the cylinder through an insulating substance." The completion of the electric circuit takes place at proper intervals by means of contacts made by the "rod which governs the expansion "gear." Instead of using an electric spark, "an orifice might "be suddenly uncovered, and thus allow a jet of flame to enter "the cylinder."

Descriptions in detail are given to the whole apparatus, and of the manner of working it; several means of employing gases as motive agents are set forth, and the details of many modifications are stated.

[Printed, 1s. Drawing.]

A.D. 1861, July 31.—N° 1907.

RYLANDS, John, RYLANDS, Thomas Glazebrook, and RYLANDS, Peter.—"Improvements in joining wire for tele-"graphic conductors and other purposes."

Previous to galvanizing, the end of each wire is twisted "in a " spiral around an untwisted portion of the other wire, leaving a " short space between the two spirals." A strip of iron or iron " wire is afterwards wrapped "around in the space between the " two spirals," and it is welded into a solid mass; "the wire and " joints may afterwards be galvanized in the usual manner. Or, " without wrapping the twisted joint round with a strip of iron " or iron wire, the twisted joint itself may be heated and welded. " Or, the wires may, as heretofore, be twisted together after gal- " vanizing and perfect contact ensured by casting on to the joint " a block of a suitable metal, fusing at a comparatively low tem- " perature. The mould in which this block is cast is so formed " as to produce a block taper at the ends, so that it may pass " freely through the insulators without catching. With the same " object, when making the joints by twisting," the inventors " make the ends taper by preference by flattening out the ends " of the wires, so that when twisted up they will give the desired " tapering form to the joint."

[Printed, 6d. Drawing.]

A.D. 1861, August 8.—N° 1975.

BOVILL, George Hinton.—" Improvements in ships of war " and other vessels, and in the manufacture of armour and other " plates of wrought iron."

1st. " The application of vulcanized india-rubber that shall " be permanently elastic to the seams of the planks and decks " of ships."

2nd. The application of "magnetic or galvanic electricity in " such manner as to produce electric currents through the metal " plates forming or sheathing a ship's bottom." The " positive " poles " of the electrical apparatus " are attached to the plates " at different parts of the ship, and the electric circuit is made " through the plates into the water." The " negative poles " " are carried into the water, and attached to plates as collectors, " and insulated from the plates or metal of the ship's bottom, to " which the positive poles are connected." " By thus applying " electric currents, the fouling corrosion and the adhesion of " barnacles and living insects will in the case of iron ships be " prevented, and in coppered ships the waste of copper will be " diminished."

3rd. Propelling and manœuvring ships by forcing out water.

4th. Using telescopic martello towers in arming ships of war.

5th. Using armour plates with flanges formed at two opposite edges.

6th. Rolls for rolling flanged iron or steel plates.

[Printed, 1s. Drawing.]

A.D. 1861, August 10.—N° 1994.

WILDE, HENRY.—" Improvements in electro-magnetic tele-" graphs, and in apparatus connected therewith."

The *first part* of this invention " relates to several improved " methods of constructing and arranging the permanent magnets " and coiled soft iron cores employed for generating currents of " magneto-electricity."

1st improvement.—Constructing the permanent magnets " of " a rectangular bar of steel bent into the form of a hoop or ring, " the ends of which are kept a short distance from each other, so " as to develope the magnetism imparted to them." The coiled soft iron cores are fixed to the said ends and a soft iron armature revolves in front of the said cores.

2nd improvement.—" Sections " [sectors?] are cut out of a " plain disk of sheet steel," " in such a manner as to leave an " equal number of radii attached to the nave at the centre." The extremities of the radii are hardened and magnetized, and they carry the coiled soft iron cores. A disc of soft iron, similar in shape to the permanent magnet, forms the armature, and revolves on an axis concentric with that of the permanent magnet in front of the cores.

3rd improvement.—" Two bundles of permanent rectilinear " magnets are laid parallel, with dissimilar poles adjoining, and " at a short distance from each other;" the coiled soft iron cores are fixed at the extremity of the said magnets. A disc or plate of soft iron forms the armature, and one of these revolves before the cores at each end of the apparatus. " The succession of inverted " currents" from these machines may be equalized " by changing " the relative positions of the separate armatures, revolving on " the same axis."

The *second part* of this invention " relates to several new and " improved methods of constructing and arranging the various

"parts of the transmitting instrument of a step-by-step telegraph" described in N° 858 (A.D. 1861).

4th improvement.—The magneto-electric machine set forth in the 1st improvement is combined with the above-mentioned transmitting instrument, by connecting the axis of the machine with the pointer axis of the instrument, by means of spur and bevil gear. The armature is made of thin metal, "the edges of "which are bent over at right angles in a direction away from "the polar surfaces of the magnetic cores."

5th improvement.—The magneto-electric machine which forms the 2nd improvement is used in connection with the dial and finger keys of the above-mentioned step-by-step telegraph. When one of the keys is depressed, an "elbow lever" on the rotating arm is forced against the interior of the cylindrical case of the instrument, so as to prevent the recoil of the soft iron armature of the magneto-electric machine. "When the permanent magnet "contains a less number of radial arms than there are keys round "the letter circle," the rotating arm is connected with the axis of the magneto-electric machine by means of "a sun-and-planet "motion," so as to transmit "the proper number of shocks "through the receiving instrument." The "iron disk" or armature of the instrument shown in the Drawings "has but half the "number of radial arms as the permanent magnet," "so that the "effective currents generated may be transmitted in alternate "directions without the intervention of a commutator." The Drawings represent the radial arms of the armature nearly wide enough to extend over two consecutive coiled cores.

6th improvement.—A method of adapting the magneto-electric arrangement described under the head of the 3rd improvement to a transmitting instrument. The armature axis is rotated, and the requisite number of shocks to indicate a given letter are sent into the telegraphic circuit by sliding a nut along a groove from the letter last signalled to that required to be signalled, the said nut revolving the armature axis by means of a screw cut upon the axis, into which the nut fits and is made to work.

The groove and nut arrangement is adapted for sending the requisite number of alternate voltaic currents to the receiving apparatus, by making the nut or block slide in the groove over serrated brass plates, each plate being connected to one battery pole, and the serrations or teeth in the plates corresponding to

the number of alternations that are to be made in the current from any one signal to any other signal.

A Brett's cylinder, with pins helically disposed upon its surface, is also applied to a transmitting instrument in conjunction with the magneto-electric machine described under the head of the 3rd improvement. The pin cylinder is connected by spur gearing with the armature axis, and the number of currents required for a given signal is regulated by inserting moveable pegs into the required holes of the dial plate, as described in N° 858 (A.D. 1861). This arrangement is not alluded to in the Provisional Specification.

7th improvement.—The application of regulating screws to the pedal motion described in N° 858 (A.D. 1861), or to the base of the transmitting instrument. To adjust the tension of the band, these screws are inserted through the base of the pedal motion and have their extremities resting on the floor.

"8th improvement.—Suspending telegraph wires to the ordi-" nary street lamp posts or to brackets attached thereto." The Final Specification does not allude to this improvement.

" 9th improvement.—The application of a magnifying glass for " reading off the letters or signs on the indicating instrument; " the object is to admit of the moving parts of the instrument " being greatly reduced in size, and consequently capable of being " actuated by very feeble currents of electricity." No mention of this improvement is made in the Final Specification.

[Printed, 2s 6d. Drawings.]

A.D. 1861, August 10.—N° 1995.

CLARKE, William Saint Thomas. — " Improvements in " railway breaks."

This invention "consists in intersecting the axle or axles of " driving wheels of locomotives transversely with a current of " electricity, and intersecting the axle or axles of the locomotive " and the axles of the tender and carriages, and the axle or axles " of the locomotive and the axles of the tender, luggage vans, " guards' vans, and waggons or trucks transversely with a single " or with separate currents of electricity, whereby most efficient " grip or bite on the rails will be obtained."

The Final Specification describes and the Drawings show brass tubes, enclosing the above-mentioned axles, but supported

in a perfectly distinct manner from them, and not revolving with the said axles; the brass tubes carry electro-dynamic coils at their extremities near the wheels, and the coils at the extremities of the same axle may either be placed upon the same brass tube or upon separate brass tubes.

A regulator is used for completing or interrupting the electric circuit through the coils. "The battery it would usually be "desirable to place behind the engine on the tender, and the "regulator near the battery in view of the engine driver and "attendant, who, by moving the pointer" "on the regulator "dial, puts the said pointer into and out of connection with such "wires and the battery, as is required."

[Printed, 10*d*. Drawing.]

A.D. 1861, August 14.—N° 2023.

BROOMAN, RICHARD ARCHIBALD (*a communication from Martin Miller*).—(*Provisional Protection only.*) "Improvements "in coating wire with copper, silver, gold, or other metal or alloy, "in order to prevent oxidation."

"The wire to be coated is first passed over a roller or pulley, "which is in connection with the positive pole" [negative pole?] "of a galvanic battery, then under one or more rollers or pulleys "immersed in a bath or solution prepared as hereafter described, "and in which a piece of copper or other metal which is to form the "coat is suspended by a platinum wire; this piece of copper being "connected with the negative pole" [positive pole?] "of the bat-"tery, the wire in passing through the bath or solution receives a "deposit or coating of copper; it then passes over a wooden roller "or pulley outside the bath, and through a vessel containg water, "on emerging from which it is cleaned and dried by a cloth, or "otherwise, and then wound on a roller to be used as required."

The solution for electro-depositing copper is made by dissolving "cyanide of sodium (cyan-kali)" [cyanide of potassium?] "and "carbonate of soda or potass in water" and boiling the solution; "the carbonate of copper is then added, and the mixture is kept "boiling until strong ammoniacal vapours are given off;" the mixture is allowed to cool and is then fit for use....

"For silver, I dissolve silver in aquafortis and dilute with water; "into the solution I pour slowly a solution of common salt. The

" precipitate obtained is then mixed with a solution of cyanide " of sodium (cyan-kali)."

"For gold, I dissolve gold in aqua regia, and evaporate to dry- " ness, and the residue is mixed with a solution of cyanide of " sodium (cyàn-kali)."

[Printed, 4d. No Drawings.]

A.D. 1861, August 15.—N° 2037.

MÉNARD, AUGUSTIN FRANÇOIS (*a communication from Yves Auguste Rehm*).—" Improvements in tanning, and in the apparatus " employed therein."

In carrying out this invention, solutions of tannin of different degrees of strength are formed with bundles of oak bark. "These " solutions are placed in a series of vats, vessels, or pits arranged " in parallel lines or in any other convenient manner. The skins " are plunged in the said vats or vessels and operated upon alter- " nately by contact with the tannin" [tanning?] "liquids in " combination with solutions of aluminum, calcium, sodium, and " other similar bodies, in which is injected carbonic acid gas or " compounds of carbon, gaseous or liquid, according to the qua- " lity and use of the leather required, for the purpose of gradually " coagulating the gelatine and albumen of the skins. *By the " action of electricity* and forcing currents of gas into the solu- " tions the pores of the skins become opened and the tannin" [tanning?] " of the leather is rapidly effected."

If a series of 40 vats are used "the solution of tannin having " acquired its greatest density in vat No. 20 then decreases in " strength until it reaches vat No. 40, whence it flows into a re- " servoir, from which it is conveyed to the vats to be again " strengthened with bark." Carbonic acid gas is conveyed into vats No. 20 to 40 inclusive by means of perforated false bottoms. " An electric or galvanic current" is established "in four vats (of " the series No. 20 to 40) containing solutions of lime, phosphate " of lime, barytes, alumina, or magnesia in combination with " gases, to assist the action of the tannin on the skins."

[Printed, 4d. No Drawings.]

A.D. 1861, August 15.—N° 2040.

FAUCHERRE, JULIAN.—(*Provisional Protection only.*) The title of this invention is "An improved mode of manufacturing " gold dials."

The inventor states:—"I first produce an engraved plate of "the dial intended to be reproduced, and from this, by means of "the electrotype process, I prepare a matrix of copper. In this "matrix I deposit any desired thickness of gold by the electro- "type process, and the gold copy so obtained, I mount upon a "backing plate of brass fitted at its back with pins suitable for "fixing the dial to the watch or clock frame. The gold electro- "type copy I secure to the backing plate by means of solder, and "in order to facilitate the process of soldering the dial to the brass "backing plate, I first submit the gold dial face to ebullition in "water, taking care to change the water frequently; and in order "to remove any cyanide of potassium which may still remain in "excess, and thoroughly to clear out the pores of the gold, I im- "merse the dial in fluoric acid and afterwards wash it in boiling "water. It is then ready to receive at its back a deposit of cop- "per which will facilitate the soldering of the brass plate thereto. "When the soldering has been effected I cover the backing plate "with a protecting coat of wax, and then immerse the whole in a "bath of dilute nitric acid by the action of which the copper "matrix will be removed from the face of the gold dial plate. "The dial may now be cleaned, cut and finished in the ordinary "manner."

[Printed, 4*d*. No Drawings.]

A.D. 1861, August 20.—N° 2069.

WHITAKER, SAMUEL, and JONES, RALPH AUGUSTINE.— "Improvements in operating upon railway signals and in indi- "cating their position by means of electricity."

1st. "Applying springs instead of weights and levers as here- "tofore, for operating upon railway signals."

2nd. "The means employed for indicating the position of an "auxiliary signal to the attendant working the same when the "signal is placed beyond his view." Electric contact is made at the signal post, and the position of the signal is indicated at the signal lever by means of "an ordinary galvanometer, with a "suitable index marked with suitable words." The "contact "springs are placed at right angles to each other on a bracket "fixed to the signal post in such a position that the signal rod "shall work through a slot in the said bracket. On the signal "rod is fixed, free to revolve with the said rod, a collar on the "under side of which are two pins or projections for forming

"contact with the said springs; one of the wires from the battery "is in connection with these projections, and the other with the "contact springs on the bracket. In working the signal the "said projections are brought round and form contact with the "said springs, when the signal is either on or off; but should "the signal be at an intermediate point contact is then broken."

For night signalling, a thermometric arrangement, placed within the signal lamp, breaks the electric circuit when the lamp goes out, and thus indicates the fact to the attendant at the signal lever. The thermometer has the electric circuit wires inserted in its tube, so that the circuit is complete (through the mercury) when the lamp is alight, but interrupted when the lamp is not burning.

[Printed, 1s. 4d. Drawings.]

A.D. 1861, August 26.—N° 2127.

TOLHAUSEN FREDERICK (*a communication from Jean Baptiste Théodore Rousse*).—(*Provisional Protection only.*) "A "new and economical method of producing dynamic electricity, "thereby obtaining useful chemical compounds."

"The principle of this method is based on this theory that the "electro-motive power of a battery is proportional to the chemical "action that takes place by the contact of a metal and an acid, "which chemical action on the other hand is directly propor- "tional to the caloric evolved, 1st, by the oxydation or decom- "position of the metal by the acid, 2nd, by the combination of "the metal or metallic oxyd with the acid used, said chemical "action being inversely proportional to the absorption of caloric "produced by depolarization."

The elements used in this battery are "iron, zinc, lead, copper, "and silver; nitric, hydrochloric acids, and clorhydrate" [?] "sulphuric, acetic, and chronic" [chromic ?] "acids. Nitric "acid being used as a depolarizer at the positive pole" [negative plate ?] "yields the best results, because it depolarizes by absorb- "ing the hydrogen with the least absorption of caloric."

A "Bunsen's pile" is described, in which the nitrous fumes are absorbed by means of oleic acid, the light oils from tar, or non-siccative oils in a glazed stone vessel placed above the porous cell; the porous cell "is cup-shaped near the upper brim," so as to allow of the insertion of the absorbing vessel. The absorbing

vessel is made of two cylinders connected by a perforated bottom; the upper portion of the carbon is of less diameter than the lower part, "so as to fit into the glazed stone vessel."

[Printed, 4d. No Drawings.]

A.D. 1861, August 28.—N° 2147.

THEILER, MEINRAD.—(*Provisional Protection only.*) "Improvements in type-printing telegraphs."

The type-printing instrument is worked by means of a Morse key at the transmitting station. "An escapement wheel actuated "by a spring is mounted upon the axle of the type wheel, and is "held in its position by a hook or catch. Two levers are applied "for raising this hook, each of which is moved by an electric "magnet, when a current passes through its coil, and when the "hook is raised, and the escapement liberated, each of the two "levers will take into a part of the escapement, thereby allowing "the escapement and type wheel to perform only a certain portion of a revolution." The above-mentioned electro-magnets are alternately excited by means of a local current whose circuit is completed by the action of reversed line-wire currents upon a "double relay." "The clockwork, which is at rest after having "performed all the functions connected with the printing of a "letter, is started by the motion of any of the escapement levers, "but directly stopped again, and only allowed motion to complete "the next letter, when the levers are at rest."

An arrangement "for applying currents of different lengths and "requiring only a single relay" and a Morse key, consists of a commutator applied to the printing instrument, by the action of which short currents only work one electro-magnet, but long currents (after exciting the above-mentioned electro-magnet) excite the second one also, and break off "the way to the first one, "thus causing the lever which was moved by the motion of that "first magnet to drop likewise."

[Printed, 4d. No Drawings.]

A.D. 1861, August 31.—N° 2181.

SIEMENS, CHARLES WILLIAM (*partly a communication from Werner Siemens*).—(*Provisional Protection only.*) "Improvements "in apparatus employed in connection with electric telegraphs,

" part of which improvements are also applicable to ascertain the " heat in inaccessible places."

1st. Apparatus for indicating the temperature of coils of electric cable, &c. A galvanic circuit contains a "thermometer coil," and one coil of a differential galvanometer; another circuit from the same battery contains a "balancing coil" and the reverse coil of the galvanometer. The "thermometer coil" is placed in contact with the coils of telegraphic cable, so that it may be subjected to the same heat as they are, and the "balancing coil" is placed in a vessel containing water. If the "thermometer coil" is at the same temperature as the "balancing coil" the galvanometer stands at zero, but if they differ in temperature, the heat of the " thermometer coil" can be ascertained by raising the heat of the liquid in which the "balancing coil" is immersed until the galvanometer indicates zero.

2nd. "The manner of printing despatches" in the Morse telegraph. The oscillating lever carries at its extremity a "writing" or "tracing" disc, and "the paper is led over a fixed pin or small " roller, situated directly over the tracing disc;" the writing disc is partially immersed in a reservoir of ink below, and receives an axial rotary motion from the clockwork of the apparatus. "By " the oscillations of the lever the tracing disc is at intervals " pressed up against the paper, thus marking it with a distinct " ink line."

The writing disc has an exceedingly short traverse.

[Printed, 4d. No Drawings.]

A.D. 1861, September 6.—N° 2234.

HENRY, MICHAEL (*a communication from Eugene Vincenzi*). —" Improvements in apparatus for signalling on railways by " means of electricity."

A "local" battery is placed at the station, and a "travelling" battery on the locomotive. Under ordinary circumstances, these batteries are so connected as to neutralize each other, but when danger is to be signalled their currents are caused (by means of a commutator) to flow in the same direction and an electro-magnetic alarum is sounded. By this means either a station can signal to a train or a train to a station or to another train. To complete the circuit, "contact springs" on the locomotive rub on signal rods in connection with the line-wire and at given distances apart.

The apparatus at the station consists of the "local" battery, a commutator for directing and reversing the "local" battery current, and two relay coils with their vibrating armatures "for " receiving the signals sent from the nearest stations, as also " signals from trains on the line." The apparatus on the locomotive consists of the "travelling" battery, a commutator, and alarum. By using station or "local" batteries and "travelling" batteries of different power, trains may communicate with other trains, independent of the station communications. The direction of the coming trains can be ascertained, either at the next station or by another train, by means of a "compass" [galvanometer needle?] at the said station or on the locomotive of the train.

[Printed, 10*d*. Drawings.]

A.D. 1861, September 12.—N° 2270.

GEDGE, WILLIAM EDWARD (*a communication from Grégoire Lucien Ripamonti*).—(*Provisional Protection only.*) "Improve- " ments in the nautical compass."

" The object of this invention is to render the mariner's com- " pass independent of magnetic influence on board ship, more " especially iron ships; and the invention consists in placing " beneath the card a number of magnetized needles, say, 24 (but " this number may be increased or diminished) parallel to each " other and with their points directed due north and south."

[Printed, 4*d*. No Drawings.]

A.D. 1861, September 14.—N° 2292.

BARNETT, FREDERIC.—" Improved automatic electric signals " to prevent collisions on railroads & railways."

The object of this invention is to prevent collisions on railways by signalling to the nearest station the positions of trains either receding from that station or advancing to it. By means of this invention " it will be known whether a train is advancing, standing still, or returning."

"Automatic electric buttons" are placed at given distances apart along the line of rail, so that the depression of the said buttons in succession, as the train advances, by the flange of the engine wheel will complete successive electric circuits, and thus register the distance of the train at any given time on an indicator

with as many numbers covered with screens as there are "electric "buttons" or electric circuits. All these circuits proceed from one battery, and the bell is included in that part of the battery circuit which is common to all the circuits.

By means of the "automatic electric buttons," when a train passes into a tunnel, it may complete electric circuits which light electric lamps in succession, "the train always lighting the lamp "at 200 yards behind it;" "the same plan when not in the "tunnels might be adopted with advantage at night." Day signals in rear of the train or otherwise may also be worked by this system. If posts are placed at the roadside facing the buttons, signals can be transmitted to the station to indicate accidents &c.

[Printed, 8*d*. Drawings.]

A.D. 1861, September 14.—N° 2298.

MORRIS, TIMOTHY, WEARE, ROBERT, and MONCKTON, EDWARD HENRY CRADOCK.—"Improvements in batteries for "obtaining electric currents and the products therefrom."

Battery cells may be made "of two or more divisions, one of "which is raised in order to act as a reservoir for the others."

"Earth or mineral batteries" are constructed "by digging a "suitable reservoir or reservoirs, and lining the same with glazed "brick or tile." A "mineral battery" may consist of oxide or "ore of copper" mixed with chloride of sodium, separated by a porous diaphragm of de-resinized wood or bark, from a dilute solution of sulphuric acid; carbon "electrodes" or plates are placed in each compartment, the result of the action of this battery "being the formation of sulphate of soda and chloride of "copper." In another "mineral battery" the same "electrodes" are placed in compartments which respectively contain iron filings or iron ore together with nitrate of soda or nitrate of potash, and dilute sulphuric acid; "the products will be sulphate of soda or "potash, and nitrate of iron."

A battery, with a raised division, may consist of chloride of copper in the raised division; in the next division, chloride of copper with a carbon "electrode;" in the next cell, chloride of calcium and a zinc plate. Chloride of zinc is formed in one cell and metallic copper in the other.

Carbon plates or vessels "may be prepared by pressure or by "uniting carbon with clay and burning it."

Batteries of these various descriptions may be combined "in "such manner that the electricity obtained from one may be used "to render the action of a second battery more powerful."

The conducting wires "may be covered with glass or any of "its compounds in any suitable manner."

[Printed, 4d. No Drawings.]

A.D. 1861, September 16.—N° 2303.

REEVES, JOHN.—"Improvements in electro-magnetic engines "for obtaining and applying motive power."

These improvements apply to the electro-magnetic engine described in N° 449 (A.D. 1861), and consist in supporting a slotted ring "on studs projecting from the fixed plate which supports "the apparatus;" the said slotted ring carries springs that are connected with the helix terminals. A commutator wheel "is "attached to the driving wheel, and when in motion makes and "breaks contact continually between the wires from the galvanic "battery and the helices. The surface of the ring or wheel for "making and breaking contact is prepared with sand, emery, or "other suitable material, so as to cause friction, and thus rub "and clean the ends of the wires as they pass over it from the "'fuse' or 'glaze' produced by the action of the electro current "when in contact, by which arrangement a great obstacle is removed which has hitherto existed, and has prevented the full "power of the battery from reaching the helices. A lever is "employed to change the position of the slotted ring before "mentioned, and with it the wires which pass to the wheel "or ring which makes and breaks contact with the galvanic "battery;" by this means the speed of the motion of the engine may be regulated and its direction reversed.

"When two or more magnetic rings are mounted and arranged "so as to act on one main shaft, the magnetic and non-magnetic "divisions on one should be even in number, and on the other "they should be odd."

[Printed, 10d. Drawing.]

A.D. 1861, September 16.—N° 2310.

BROOMAN, RICHARD ARCHIBALD (*a communication from Charles Pougnaire and Joseph Stephane Bourcy*).—"Improvements

" in apparatuses for stretching, supporting, and uniting telegraph " wires."

1st. " Forming the rollers in apparatuses for stretching tele- " graph wires with a slot extending to the axis and forming the " axis hollow from the point where the slot terminates." By this means a third wire for uniting the two stretched wires may be dispensed with.

2nd. " Stretching telegraph wires by means of pincers made " with grooved jaws for gripping the wires." The legs of the pincers are connected to the draw bar by two connecting rods, so that the force applied by the windlass cord tightens the jaws on the wire at the same time as the said wire is stretched.

3rd. A ratchet brace for turning the stretching rollers. A ratchet wheel, with a square central aperture, is mounted loose in the key, and turned by a click whose centre of motion is fixed to the said key.

4th. " Apparatuses for supporting telegraph wires." A fixed upright has a jaw hinged to it; " the upright and jaw are formed " with grooves in which the wires are placed and supported; " " the two parts of the support are kept together by means of a " screw." In another apparatus the jaw is hinged at one end to the upright, and the other end of the jaw is retained by a key entering a mortice.

5th. " Apparatus for joining the ends of telegraph wires." The wires are placed on grooved blocks, one of them passing through a hollow axle. When the axle is rotated, the shorter end of the wire is wound round the second wire. The position of the wires is then reversed, " and the operation is repeated for the second " wire."

[Printed, 1s. Drawings.]

A.D. 1861, September 25.—Nº 2387.

BANKS, James.—(*Complete Specification but no Letters Patent.*) " Improvements in electro-magnetic telegraph printing appara- " tus or marking instruments, and the instruments or apparatus " to be used in connection therewith."

The active parts of a printing instrument consist of a train of clockwork and the armature of an electro-magnet. The symbols used are dots and lines of various lengths, which are impressed on the moving paper by means of a " freely revolving disc." The

only purpose for which the clockwork is used "is for rotating the "drawing-off rollers and causing the strip of material to move "through the marking apparatus at an uniform speed of travel."

The marking apparatus consists of a "revolving armature," whose vertical rod carries a "striker" or "button-shaped piece" at its upper extremity; a "guide sheath" or spring paper guide; a marking roller or "freely revolving disc"; and an inking roller. The poles of the electro-magnet project inwards, so that the armature (which is "on the under side" of the poles) is attracted upwards when the electric current passes; the striker is thus made to press the paper towards the marking roller, for the time required by the symbol. The motion imparted to the marking roller by the motion of the paper renders it self-inking. The "striker" is made to rotate on its vertical axis by its eccentric contact with the paper, and thus it is prevented from becoming permanently magnetized.

The flanged inking roller, with a reservoir and worsted between the flanges, is also described and shown.

The electro-magnetic arrangement, comprising the revolving and sliding armature, may also be used in relays, or instruments "for transmitting through intermediate stations." The ordinary transmitting key is used at the sending station.

[Printed, 10*d*. Drawing.]

A.D. 1861, September 25.—N° 2395.

NEWTON, ALFRED VINCENT (*a communication from Giovanni Caselli*).—"Improvements in the construction of and mode of "working telegraphic apparatus."

According to this invention the signals are sent by means of "the "synchronous movements of weighted pendulums at the trans- "mitting and receiving stations." The "pantelegraph arrange- "ment," through which the synchronous currents pass at each station, "will produce a counterpart of the message intended to "be transmitted;" this arrangement consists of two segment-shaped tables and two traversing styles, which work on a slide and are operated by the pendulum through the intervention of a rocking lever and connecting rod. A chemical change is made in the paper at the completion of each oscillation of the pendulum.

The movements of the pendula are rendered synchronous by means of fixed electro-magnets between which they oscillate, the

said electro-magnets being magnetized and de-magnetized at certain intervals, dependent upon the vibrations of a regulating pendulum actuated by clockwork and making two oscillations for every oscillation of the larger pendulum. A local battery operates the circuit breaker of the regulating apparatus.

Whenever the transmitting style breaks the circuit "the current "is diverted into the line wire." When the signalling line-wire current ceases, a weak opposite current is made to depolarize the receiving style.

A Morse "pantelegraphic apparatus" consists of a cylindrical receiving table to which intermittent axial motion is imparted; the styles are operated by the pendulum and are rocked into and out of action by means of a "sliding rack bar."

[Printed, 1s. Drawing.]

A.D. 1861, September 28.—N° 2425.

REEVES, John.—"Improvements in electro-magnetic engines "for obtaining and applying motive power."

"These improvements consist in constructing helices with "copper or other metal cylinders, and placing them one, two, or "more in number as may be required, in line with each other, "leaving a space between the ends;" through these helices is passed "a metallic piston encircled with iron tubes placed at "proper distances apart from each other, which, when acted upon "by the electric current are put in motion, and the piston is thus "caused to pass through the helices from one end to the other of "the series and back again, to a greater extent than it is possible "to obtain by the piston passing through one helix alone. The "piston is connected by a rod to a crank on a driving axis to "give motion thereto." "The combined and successive action "of a series of helices" may thus be brought to bear on the driving shaft.

"Another arrangement may be made to do away with the rod "connecting the piston with the crank axle by fixing the helices "to a frame which has pins or trunnions attached thereto, so that "the piston rod being connected directly to the crank on the "driving axle causes the frame containing the helices and piston "to oscillate with the motion of the crank on the working shaft." The commutator and regulating and reversing apparatus is similar in character to that described in N° 2303 (A.D. 1861). This ap-

paratus is described at length in the Final Specification and shown in the Drawings; the commutator wheel is therein shown to have alternate rotary motion communicated to it by means of a rack (fixed on to the moveable piston) working into a spur wheel.

[Printed, 1s. Drawing.]

A.D. 1861, September 28.—N° 2429.

THEILER, MEINRAD.—" Improvements in telegraphs."

1st. Dial telegraphs.—Two escape wheels are mounted on the pointer axis of the receiving instrument, the said pointer axis having a tendency to revolve by means of suitable clockwork; one escape wheel has double the number of teeth that the other has. Upon the excitation of the line-wire electro-magnet, one of its magnetized keepers only is active, and acts upon one of the escape wheels, there being one armature lever or pallet to each escape wheel, and a detent lever, which is raised by the movement of either of the pallets. This construction enables a positive current to move the dial hand forward one letter during its continuance, " and a second letter when the current ceases;" a negative current moves the dial hand forward three letters during its continuance, and one letter on the ceasing of the electric current."

2nd. Type-printing telegraphs.—The type wheel is fixed on the axis of the escape wheel of the dial telegraph, and is rotated at the same time as the said escape wheel. During the revolution of the escape-wheel axis, a lever that actuates the printing hammer is kept motionless, but as soon as the escape wheel is at rest the printing hammer is set free. The paper is also moved by the clock train, which may be made to replace the band and type wheel at zero after each letter. The printing operations may be performed by a local electro-magnet instead of by the clock train. A transmitting key is used, " by means of which the current can " be reversed and kept on line until it is broken off by a motion " of the key in another direction." A key board may be used similar to that described in N° 1110 (A.D. 1854), with one key to send the requisite currents into the line-wire for each letter.

3rd. Morse marking instruments.—A " double dot " takes the place of the dash of the ordinary Morse alphabet. " The printing " of the dots on the second line " is performed " by an extra " magnet but on the same wire, and by a current of the same

" direction. On printing a dot, the writing lever establishes the " way to the second magnet, but only for a moment, the time " being regulated by the clockwork. If a second current arrives " directly after the first, the second magnet prints the second dot, " thereby replacing the dash. The two currents causing the " double dot are sent by a second key, which on being depressed, " makes an interruption between two contacts. This arrange- " ment also allows of the printing the common Morse signs, the " dot and the dash, in connection with the double dot."

[Printed, 1s. Drawing.]

A.D. 1861, October 3.—N° 2464.

HENLEY, William Thomas.—" Improvements in magnetic " and electric telegraph apparatus, which are also applicable to " other purposes."

1st. " Magneto-electric machines consisting of a wheel revolv- " ing on an axis, on the periphery of which, in two rows or more, " are fixed pieces of soft iron or other metal susceptible of magnetic " induction, such pieces, by the influence of a permanent magnet, " inducing magnetism in, and reversing the polarity of an arma- " ture wound with wire, the latter, the armature, being stationary, " and entirely distinct and separate from the permanent magnet, " except when brought into magnetic connection by the before- " mentioned pieces of iron; also constructing magneto machines " with one wheel, with pieces of iron affixed thereto, or forming " the wheel of iron with projections for the purposes before " mentioned."

These machines may also be constructed with a lever and only a portion of a wheel instead of a whole wheel.

Nos. 2769 (A.D. 1856), and 734 (A.D. 1861), are referred to in this portion of the invention.

2nd. Receiving, relay, and printing apparatus.—A horseshoe electro-magnet is used in combination with two magnetic needles which " cross each other at the axis, but are separated by brass or " other non-magnetic metal or material. The poles are alternately " attracted and repelled by the electro-magnet as the inverted " currents are transmitted from the sending apparatus." A hollow and perforated ink roller is used for a Morse instrument; the roller is surrounded with a piece of cloth and filled with fluid ink.

3rd. A method of indicating the instrument called, when a number of telegraphs are arranged in the same room.—A wooden flap, marked with the name of one of the corresponding stations, is ordinarly kept in its place by means of a permanent magnet wound with wire in circuit with the corresponding instrument; when, however, "a current passes through the coil in the direc-" tion to reverse the polarity of the magnet," the flap falls, discloses the name of the corresponding station and sounds an alarum by completing the circuit of a local battery. At the end of the message an attendant closes the flap, the permanent magnet being then able to act. This arrangement may be used for other indicating purposes.

4th. Voltaic batteries.—The negative plates consist of copper roughened by means of nitric acid, then electro-coppered and electro-silvered; these may be platinized and used with amalgamated zinc and dilute sulphuric acid. The zinc plate is either placed in mercury in a horizontal sunk recess at the bottom of the battery cell, or in "a narrow vertical chamber for receiving " the zinc and mercury."

[Printed, 2s. 8d. Drawings.]

A.D. 1861, October 3.—N° 2467.

LAW, Henry.—This invention is entitled "Improvements in " machinery and apparatus for raising ships and other vessels out " of the water, for the purposes of examination, cleaning or " repair, some of which are applicable to the docking of vessels " for the same purposes," and a portion of the said improvements involves the use of electric force.

1st. Raising vessels by means of inclined slipways.

2nd. Supporting a ship on a cradle or in a dry dock.

3rd. "Constructing the blocks or supports upon which a vessel " is intended to rest when grounded either upon a cradle or in a " dry dock, in such manner as to show whether the vessel is " bearing upon or in contact with each block, and also to show " the moment at which such contact takes place with each parti-" cular block or support." A hinged flap attached to the upper part of a block is made to project slightly above the general surface of the block "by means of a counterpoise weight;" when the vessel comes into contact with the said block the flap is depressed, and two contact surfaces in the interior of a vulcanized India-rubber tube are drawn apart, thereby *breaking* a previously

existing electric circuit and altering the deflection of a magnetic signal needle. The grounding of the ship may also be shown by the *completion* of an electric circuit through two wires enclosed in and kept apart by a vulcanized India-rubber tube, the said tube and wires being forcibly compressed when the ship rests upon a block carrying the said tube. Other means of effecting this purpose are described and shown.

4th. "Constructing the blocks or supports upon which the "vessel is intended to rest when grounded either upon a cradle "or in a dry dock."

[Printed, 1s. 6d. Drawings.]

A.D. 1861, October 9.—N° 2517.

HASLEWOOD, Edward (*a communication from Samuel Thompson Armstrong and Jared Wilson Post*).—(*Provisional Protection refused.*) "Improvements in apparatus for preventing or "lessening the slip of the driving wheels of locomotive engines."

"The invention has reference to that class or description of "apparatus by the use of which it has been sought to effect a "more perfect bite or adhesion of the wheels upon the rails by "the application of an electric helix or coil applied at or near to "the lower portion of the periphery of the wheel, so that the "wheel may rotate within, but without touching the helix or coil, "and become converted into an electro-magnet. And the said "invention comprises the following improvements, namely, the "constructing such apparatus with the helix or coil covered, in "respect of the appearance it would present in elevation or side "view when applied to a wheel, so that the lower portion of the "curve might be disposed at or in proximity to the lowest portion "of the wheel, that is to say, where the wheel and rail are in "contact, whereby it is intended to obtain a maximum or an "increased magnetic effect; also it comprises means of adjust-"ment for varying the position of the helix or coil; also means "of insulation of the helix or coil; also the 'laying up' or "constructing the helix or coil by a continuous coil of copper "or other wire from the bottom to the top, and from the top to "the bottom, as distinguished from the hitherto method, which "has been to coil from the bottom to the top, then cross the "end, and go back to the bottom, thereby crossing the ends at "every layer of wire."

[Printed, 4d. No Drawings.]

A.D. 1861, October 9.—N° 2521.

COATHUPE, HENRY BENTINCK, and WALTHAM, FRANK HIGGINS.—The title of this invention is "Improvements in ob-" taining or producing and applying embossed or raised and " engraved or indented metal or other surfaces," and some of the said improvements involve the employment of electro-depositing processes.

To produce surface letters, layers of gum are to be laid on the surface of the letters of "a forme of type;" "the forme is then to " be filled up even with the level of the gum" with wax, "and " the whole must be immersed in warm water to dissolve the " gum," "and the surface only of the type will remain exposed. " This surface is to be subjected to the process of electrotyping " with copper or other metal. As soon as this coating reaches " the level of the wax these surface letters are to be removed " from the type, and another similar quantity may be obtained by " repeating the process, the wax" "still remaining with the type."

"Types with a slight incline or bevil, with spaces and leads to " match to save flooding in moulding, and from which an electro-" deposit may be taken direct, are to be cast by the usual process " of type founding, being, in fact, printers' types, with a slight " deviation in sinking the dies."

"Letters can be produced in brass, iron, or copper, either by " *depositing* in metal moulds previously obtained from types, or " by casting from patterns produced by any of the methods " herein specified."

"Multiplication of letters at one time.—A mould is taken from " the types, and a cast is taken from the mould; then we *deposit* " on the top of the cast, brass, copper, or other metals; this is " then taken from the metal mould" and is used in connection with a peculiarly constructed "dipping box."

"Electro for casting ornamental work, embossed or depressed, " from plaster moulds.—A mould is first to be taken of the " object, and then a second mould is taken from that, bringing it " back to the original; then we steep it in hot wax, or coat it " with spirit varnish, then we blacklead the surface. We then " place it in the bath, and subject it to the action of the electric " battery, so as to cause metallic decomposition, and a mould is " then produced from which any number of casts can be taken." " The same results may be produced by the use of metal moulds,"

from which "electro-metallic" moulds are produced "wherefrom "to cast."

"Electros from embossed or figured cards for casting without "moulding.—We take an embossed or figured card, and fix it "down by adhesive materials to a metal plate; we then treat its "surface with either varnish or wax; then we blacklead the sur- "face; then we electrotype or coat it; then a reverse plate is pro- "duced for casting; then we take the copper or other metal "letters, or plaster, vegetable, or earthy letters, and fix them on "the inner surface of the mould so produced, according to the "printers' method; then we cast, by dipping the mould into "molten metal."

"Assuming that we have a metal plate with an indented surface "reading the right way, we deposit by the electrotype process "upon its surface, and into its depths to any required thickness, "whereby we obtain a raised surface reading the wrong way, from "which printed impressions can be obtained."

"Looking-glass and picture frames.—We take an embossed "surface or series of surfaces or borders which have been cut or "divided from originals; we join them together so as to form a "large or elongated surface or frame; we take a mould there- "from in plaster and cast, or we treat the surface with plumbago "and electrotype therefrom, and from the electrotype mould so "produced we cast, which represents the original. The electro- "types or casts can be plated, gilt, or coated with richer metals."

"To get raised surfaces from the letters, from printing types or "designs."—They are flooded with plaster, treated with a mixture of gum and whiting, flooded with wax, and placed in warm water, thereby dissolving out the gum; a mould in plaster and a cast from that mould is then taken. The cast is sunken and is "indented the wrong way." The plate is then submitted "to "the electro battery; if letters, coat the surface with non-con- "ducting material, and the letters will leave the metal mould "perfect and detached. If designs, after the small cells have "been filled in with copper up to the edge of the wax, it will "then begin to spread, and continue all over until a perfect "copper plate is produced reading the right way, from which "to mould and cast at pleasure."

"Large sized electros.—Where the size of a plate is required to "be very large, the surface letters are laid down on a metal slab, "after the printers' method, and fixed with adhesive materials, as

" before described; then we place the plate bearing the surface " letters into the bath, and we produce an engraved plate with " inlaid letters of a silvery hue to contrast with the deposited " copper."

" Electros direct from an ordinary forme of type.—We flood " the forme with plaster to its surface; when nearly hard, we " remove by means of brushes and water the quantity required " to give depth to the electro; we then prepare the entire surface " for an electro-deposit; we place it in the bath and an engraved " surface is produced, reading the right way."

Other processes, not involving the application of electro-deposition, are detailed in this Specification.

[Printed, 6d. No Drawings.]

A.D. 1861, October 12.—N° 2545.

CLARK, John.—(*Provisional Protection only.*)—" Improvements " in electric telegraph apparatus."

In a needle telegraph, the finger keys are arranged " similarly " to the keys of a concertina," and the depression of a single key sends the succession of currents required to make up the corresponding signal. The apparatus " may also be applied to " telegraphs of the Morse class."

In a dial telegraph, the depression of a finger key arrests the motion of a spindle (which rotates by clockwork) by means of a radial arm; when the said arm comes in contact with the key or stop, it completes the line-wire circuit, which acts upon a magnetic armature at the receiving station, so as to arrest the motion of a disc, the said disc being rotated by clockwork " at the same speed " as the rotating spindle at the other end." " The motion of the " clockwork at both ends is by preference regulated by vibrating " pendulums connected with the rest of the works by cranks " contrived to dispense with the intermittent motion of the " ordinary escapement."

The receiving instrument may retain " a number of successive " signals in view for a limited time. A number of indicating " discs are mounted on a wheel or frame with their planes dis- " posed radially round an axis." A current, " at the commence- " ment of each revolution of the rotating arm," shifts round the disc frame to the extent of one disc, and places it (the disc) in such a position that it is acted upon by the clockwork when the radial

arm comes into contact with the stop; each disc in succession is thus acted upon, and thus nearly as many signs may be kept in view as there are discs. Printing types or markers may be formed at the edges of the discs.

[Printed, 4d. No Drawings.]

A.D. 1861, October 18.—N° 2606.

CHEYNE, CHARLES, and MOSELEY, THOMAS BEEBY.—"Improvements in the construction of apparatus for signalling "on railways, by which improvements the signalling apparatus is "rendered self-registering or recording, and also applicable for "measuring and recording the speed of passing trains, and the "time of their passage, part of which improvements is applicable "for recording the speed of trains where signalling is not required."

At each semaphore signal, a strip of paper is propelled by clockwork continuously and "at a regular speed past a number of "marking instruments." These "marking instruments" or markers may either be made to act on the paper by electro-magnetic or electro-chemical means. By means of suitably-arranged electric circuits and breaks, one of the markers is appropriated to record the lapse of regular intervals of time; a second marker registers each time the semaphore arm is raised to indicate danger, and continues in action during the whole time the said arm is in a raised position; the circuit "of a third marker is completed by the distance signal "when it is brought to indicate danger; that of a fourth marker "is completed each time a train passes the semaphore signal, "the train moving a piece of metal, and so bridging over the gap "previously left in this circuit; the circuit of a fifth marker is "completed similarly by a train passing the distance signal." The time marks being taken in conjunction with the situation and length of the other marks, enable the times of these occurrences and their duration to be known; if the length of the train or the distance between the semaphore and distance signals is known, the speed of the train can easily be determined.

[Printed, 8d. Drawing.]

A.D. 1861, October 23.—N° 2656.

PULVERMACHER, ISAC LOUIS.—"Improvements in appa-"ratuses for the production of galvanic and magneto-electric

" currents, and in machinery employed in making some of the " apparatuses."

" An atmospheric flexible battery."—Partially insulated metallic wires " of an electro-motoric action (say, zinc and copper wire) are " wound in parallel flat spirals round a flexible band of textile fabric " or any other suitable flexible material by mechanical means." The partial insulation consists in covering the said wires with thread " wound round the wire in distant spirals." A constant supply of the exciting fluid is kept up by means of a capillary-tube arrangement, and the "galvano-piline fabric" may be wound spirally (with a ribbed sheet of gutta percha between the coils) and placed in a low open vessel. In an intensity arrangement, the zinc is soldered to the copper at equal distances, and suitable divisions of the zinc and copper wires are made; the part where the elements are divided is impregnated with a waterproof varnish.

" A polarization battery."—Platinized platinum wires are combined with textile materials " in such a manner that the coils of " platinum wires form a tube, which receives at the inside one " kind, and the outside another kind of electric polarization." An intensity arrangement may be made. Oxygen and hydrogen, or other gases or liquids, may excite this battery.

The spinning machinery employed for manufacturing the batteries before described, consists of two bobbins, a hollow axle, and flat steel guide plates.

" A centrifugal magnetic machine."—The armature is caused to come into momentary contact with the permanent magnet, during its (the armature's) revolution, by means of a centrifugal governor, which has a longitudinal motion as well as a rotary motion. Coils are placed on the magnet as well as on the armature.

[Printed, 1s. Drawing.]

A.D. 1861, October 24.—N° 2661.

MORRIS, Timothy, WEARE, Robert, and MONCKTON, Edward Henry Cradock.—" Improvements in magnets, in" duction coils, and in insulating wire and metal for electric and " other purposes."

Permanent magnets are made of cast iron. They are decarbonized, fitted, recarbonized, hardened, and magnetized.

Induction coils are constructed "of graduated wire, it being "made thinner in its first coils and thicker as it proceeds on- "wards."

In insulating coils, a very thin layer of gutta percha, or other insulating medium, is introduced between the first and second coils, and the thickness of the layers introduced between the succeeding coils is "increased as the number of coils is increased." The wires composing the coils may be coated with collodion, gun cotton, or a mixture containing shellac, gutta percha, and India-rubber. A mixture of collodion and suitable non-conducting oxides may be used to insulate wires. If the oxide of iron is used, and intense currents are not employed, no other insulator is required.

"We prepare all telegraphic wires for deep sea and land pur- "poses with coatings or coverings of the nature before described, "by which means they become sufficiently insulated without "having recourse to other coverings, although others may be "used for further protection. We also coat wires with paint pre- "pared with oxydized iron, and then cover that with collodion, if "necesary, for all electrical purposes."

In the Provisional Specification, when single line wires are used, it is proposed to make them thicker at the ends than they are half way between the terminal stations.

Nos. 653 (A.D. 1860), and 2298 (A.D. 1861), are referred to in this Specification.

[Printed, 4*d*. No Drawings.]

A.D. 1861, October 26.—N° 2682.

BARNETT, Frederic.—(*Provisional Protection only.*) "Im- "proved electric danger signals for railways and other cognate "purposes."

The inventor proposes "that between all stations on railways "there shall be on each side of the line (for the up and down "trains) tall posts erected, surmounted by round balls or other "shaped signals of sufficient size to be seen afar. These "signals to work in grooves, and be sustained in their places "each by a catch connected with a galvanic pile or battery; "the communication between the said galvanic pile or battery "and the moveable ball or other shaped signal shall be at the station on either side of the said post or posts, supporting each

" a moveable ball or other suitable signal of whatever shape, by " means of which connection the person at the station or else- " where in charge will be able, by completing the circuit of elec- " tricity to cause these moveable signals to fall (at the distance of " many miles) from the upper to the lower part of the groove on " the signal post. Thus during the day giving abundant notice " to drivers to arrive cautiously, and avoid collisions."

The inventor proposes for night signals "that the same or other " similar tall signal posts shall be surmounted by electric lamps, " having the half only clear facing the arriving train, the other " half dark, to avoid misleading trains coming in an opposite " direction." "The power of lighting the said lamps will be in " the hands of the manager of the same signals at the stations " between which they will be situated." " Common lamps may " also be adopted with screens to blind the light to be let fall by " electricity."

[Printed, 6*d*. Drawing.]

A.D. 1861, October 28.—N° 2699.

CLARK, WILLIAM (*a communication from Alphonse Edouard Aufray and François Germain Léopold Tabar*).—(*Provisional Protection only*.) " Improvements in the means of obtaining & " producing printing surfaces."

The design is engraved on a slab of slate, which " is then pre- " pared by the ordinary means, and submitted to a galvanic bath " of salts of copper, which causes a layer of copper to be deposited " on the slate, which penetrates into all the hollows of the designs, " and becomes solidified, the copper on being detached from the " slate furnishes a surface or block in relief, which is then mounted " and employed as usual. Instead of engraving directly on the " slate, it may be first coated with paint, on which the artist or " engraver first draws, and then engraves or produces the design. " The copper block in relief being thus obtained, another block " may be obtained from it similar to the original design on the " slate. The chief merit of this invention is the facility of ob- " taining the blocks, and also of reproducing the original design " from the same block. Instead of slate, any other schist of a " slaty or silicious nature may be employed not acting" [being " acted?] on by the galvanic bath, and sufficiently soft to bear the

"action of a graver. Plates of bitumen, asphalte, or similar "material, may also be employed."

[Printed, 4d. No Drawings.]

A.D. 1861, October 30.—N° 2725.

COOK, WILLIAM, and COOK HENRY.—"Improvements in "printing telegraphs."

This invention "consists in preparing the paper (on which the "despatches are to be printed by the agency of electricity) with "a salt of manganese, which for various reasons will be found "more advantageous and useful than the chemical agents usually "employed for analogous purposes."

In carrying out this invention, it is "convenient and advan-"tageous, before submitting the paper to the chemical solution "or salt of manganese, to prepare it with an alkali, so that "any free acid contained in the paper or in the solution of man-"ganese may be neutralized and prevented from acting injuriously "during the action of the current of electricity on the manga-"nese salt. The alkali will also prevent the decomposed salt from "being re-dissolved in the solution."

"The nitrate of manganese is preferable to any other salt" for the purposes of this invention.

[Printed, 4d. No Drawings.]

A.D. 1861, November 2.—N° 2755.

WALKER, THOMAS.—(*Provisional Protection only.*) "Certain "improvements in the construction of cables or chains for tele-"graphic and other purposes, and for machinery connected "therewith."

These "improvements consists in using pieces of iron or other "metal pipes, and joining them together with certain joints so "as to form a continuous chain of any desired length. By "passing an insulated telegraphic wire or wires through the "pipes, communication can be effected and continued across "rivers, seas, oceans, or other places." The main object of this invention "being the protection of the telegraphic wire or wires "from injury from abrasion or other accidents by means of these "pipes, they forming a firm and solid external covering to the "wire or wires." In certain parts of the pipes, joints, in the form of "a collar turned in at one end," are used. The machinery

for making wrought-iron pipes is as follows:—A mandril is used "made into the form of the internal part of the collar, and a "sunk die to fit the external part. A straight collar of iron "being made hot, and placed on the mandril, and the die "being brought close by any pressure will form the collar. "These pipes can be used as part of the rigging of ships to "answer the purpose of ropes or chains, and can be used as "speaking tubes, either by themselves or by passing gutta percha "or other tubes through them. Protecting the internal tubes "from injury, they can be applied also to some hydraulic pur-"poses." The inventor claims "to enamel the pipes with any "suitable vitrious or other material to preserve them."

[Printed, 4d. No Drawings.]

A.D. 1861, November 5.—N° 2784.

BOUSFIELD, George Tomlinson (*a communication from Jabez Ellis Walcott*).—"Improvements in electro-plating or de-"positing metals."

"A solution of fused cyanide of potassa of great strength is "employed in connection with a powerful galvanic current; into "the cyanide of potassa bath there are plunged in the first place, "two metal plates, the one of iron and the other of copper, and "the terminals of the battery are connected with the plates. "When the copper commences to be freely deposited on the iron "plate this plate is removed, and the article to be covered with "copper substituted for it, being similarly connected with the "battery terminal. In this manner iron and other metals may "be rapidly and economically plated with copper without the "employment of either sulphate or cyanide of copper, and "without danger or inconvenience to the workmen."

This electro-coppering solution is worked at 150° Fahrenheit.

[Printed, 6d. Drawing.]

A.D. 1861, November 8.—N° 2805.

SIEMENS, Charles William.—(*Provisional Protection only.*) This invention is entitled "A vessel and gun, or guns connected "therewith, for use in naval warfare," and the gun is fired "by "the commander of the vessel by means of a galvanic battery "and connecting wires."

A powerful armour-plated steam vessel, having a low deck with only three projections or "look-outs," has a large brass gun "fixed rigidly into the stem of the vessel about four feet below "the water line. This gun is made breach loading, being closed at "the breach by means of wedges, and it can, moreover, be closed "at the muzzle, by means of a sliding valve worked from within "the vessel by means of a rack and pinion, or in any other "suitable manner."

"The projectile consists of a cast-iron cylinder containing two "cavities, which communicate by means of a fuse hole. The "front cavity being filled with gunpowder is closed in front by "means of a steel head, which is tapered towards the front, and "is terminated by a concave surface, producing a circular cutting "edge to lay hold of the side of the enemy's ship in striking the "same obliquely. The second cavity receives the charge after the "projectile has been placed in the gun." "When the charge of "compressed powder in the aftermost chamber is consumed in "discharging the gun, the fuse at the end of it will convey the "fire to the foremost close chamber" and explode the powder therein, "say half a minute after the projectile has left the gun."

The breach produced in the side of the enemy's ship by this gun is supposed to be from three to six feet below the water line.

No. 2074 (A.D. 1860) is alluded to in this Specification.

[Printed, 4*d*. No Drawings.]

A.D. 1861, November 8.—N° 2807.

CLARK, William (*a communication from Auguste Lucien Vérité, and Julien Stéphane Bazin*).—(*Provisional Protection only.*)

"Improvements in railway signal apparatus for the prevention of "the collision of trains."

The train, in passing a signal, indicates that the line is blocked by mechanical means; when the train arrives at the next signal its disc is turned "to red," and at the same time it returns the first signal "to the indication of (line clear)" by establishing an electric current. "Thus all the discs being in communication "with one another it is easily known if a preceding train has "cleared the distance between any two discs."

An apparatus, placed near the stations, indicates "in what "position the disc is which commands the entrance and exit of

" the station; for this purpose a small repeating or controlling " signal disc is placed in the position in which it is wished to " control the movements of the trains similar to the discs herein- " before described, and furnished with treadles worked by the " foot which serve the same as for the other signal posts to turn " the controlling disc. This apparatus is in electrical com- " munication with the first discs of entry and exit to the station, " so that it repeats all their movements and which is a counter- " part thereof. Moreover it has a controlling action, as if the " disc of the line is white, & it is wished to ascertain a second " time that it is at white, the treadle is oscillated with the foot, " the controlling disc will then return to white by reason of the " electrical communication. The action will be the same if the " disc be at red."

[Printed, 4*d*. No Drawings.]

A.D. 1861, November 13.—N° 2850.

CLARK, William (*a communication from François Alphonse Adéodat Dufournel*).—This invention is entitled " The application " of electricity in refining cast iron, for the purpose of converting " it into wrought iron or steel, with or without the addition of " other agents."

" This invention relates to an improved method of refining " cast iron for converting it into wrought iron or steel, which " process consists in the application of electricity by means of a " pile or other electrical apparatus to the metal in a state of " fusion, combined with substances capable of powerfully acting " on the bodies constituting the principal impurities of the iron, " for the purpose of extracting them therefrom. I may employ " in this manner as re-agents, either solid or fluid, gaseous or " non-gaseous bodies in a state of vapour, by causing gas or " vapours to penetrate into the metal in fusion, either by means of " a tube conducting them separately thereinto, or by employing a " tube which answers the double purpose of conveying both said " gases or vapours and the electricity at the same time.

" The electricity may be employed for refining iron as manu- " factured in the ordinary apparatus, by applying it at a given " moment while the iron is in a state of fusion. The invention " may also be applied for refining other metals besides iron."

[Printed, 6*d*. Drawing.]

A.D. 1861, November 23.—N° 2944.

WEEMS, JOHN.—" Improvements in the manufacture of me-" tallic tubes, and in coating or plating metals."

" This invention relates, firstly, to the manufacture of metal " tubes, with a view of producing a cheap substitute for brass or " other similar tubing. Under one modification zinc tubes are " formed by passing the metal strips through dies or rollers, and " the overlapping or contiguous edges of the metal are brazed or " soldered with the aid of the blowpipe, or other equivalent " means. The tube may then be passed through a die, or other " suitable aperture, in order to impart a smooth finish thereto. " The tube is then to be coated with copper, either by means of " a galvanic battery, or by immersion in cold or heated solutions " of the salts of copper suitable for precipitating the metallic base " upon the surface of the tube. These tubes may also be coated " or plated with compound solutions of metals, so as to deposit a " metallic alloy upon the surface of the tube; or its surface may, " if preferred, be coated with tin and its alloys, or bronzed or " lacquered." " These tubes may also be plated with silver or " gold."

The second part of this invention " has reference to the coating " or plating of zinc mouldings, beadings, astragals, brackets, and " other struck work;" it is preferred to work the zinc in a heated state, or to have it annealed from time to time during the manufacture. " The surfaces may be plated with different " metals." Perforated zinc blinds may either be ornamented with electro-plating, electro-gilding, or colour, or with a combination of these.

Chemical vessels of zinc may be " rendered acid-proof by " coating them with any of the metals or metallic alloys which " are capable of being precipitated by galvanic agency or other " equivalent means."

[Printed, 4d. No Drawings.]

A.D. 1861, November 27.—N° 2991.

CLARK, WILLIAM (*a communication from Pierre Désiré Prud'homme*).—" Improvements in the construction of parts of " electric telegraph bell apparatus, and in apparatus used in " making the same."

This invention consists of an improved construction of the soft iron armature of the electro-magnet that works electrical signal bell apparatus. The said armature is formed "out of a piece of "sheet iron suitably shaped and doubled to a V form in its "transverse section. In the space between the two branches of "the V-shaped piece of metal I fix a rod by the blow of a "suitable 'set' or former, the enclosed end of the rod received "into the metal being squared, to the other end I attach a "spring also by pressure applied so that it nips the extremity of "the spring. For this purpose I employ certain instruments of "this invention as far as relates to their application for the above "purpose, which consist, 1st, of an instrument for cutting and "shaping the metal; 2ndly, a folder or doubler of said metal, "and 3rdly, flattener for uniting by pressure the two parts con-"sisting of the stem and spring with the soft piece of metal."

[Printed, 6d. Drawing.]

A.D. 1861, November 28.—N° 2997.

WILDE, HENRY.—"Improvements in magneto-electric tele-"graphs, and in apparatus connected therewith."

1st. Improvements in the magneto-electric machines set forth in No. 1994 (A.D. 1861).

In one machine, described in the Specification and shown in the Drawings, a number of rectilinear permanent magnets, with soft iron coiled cores placed on their extremities, "are fixed upon a "suitable frame in the circumference of a circle, and at right "angles to its plane;" soft iron radial bars, mounted on the central shaft, are made to revolve before the free extremities of the coiled cores, "the wires of which are so coupled up that the "electric currents generated in each are propagated simulta-"neously through the same conducting wire."

In a second machine, horseshoe permanent magnets carrying the coiled cores are mounted radially in series; soft iron bars, "extending the whole length of the series of magnets, are fixed "to arms attached to the revolving shaft." "To equalize the "succession of inverted currents produced," the armatures are in sets, and their relative position is such that when one set is approaching another set is receding from their respective magnets.

In a third machine the radial armature revolves between the ends of the coiled cores.

The currents from the above-described machines may be used to telegraph "through uninsulated submarine metallic cables," in which case an additional uninsulated metallic cable is used in lieu of an earth plate.

2nd. The submerging of uninsulated metallic cables in separate longitudinal sections —"The extremities of all the sections are "collected together at each shore end, and joined so as to form "one conducting cable."

[Printed, 1s. 6d. Drawings.]

A.D. 1861, November 29.—N° 3015.

TYER, Edward.—"Improvements in electric telegraphs."

1st. "An improved arrangement of magnetic armature and "electro-magnets, which arrangement is applicable to numerous "useful purposes in electro-telegraphy." — Two semicircular pieces of soft iron (magnetized by induction from a fixed permanent magnet) are fixed on an axis between the coils of the electro-magnet and parallel thereto, so as to be deflected according to the temporary polarity of the said electro-magnet.

2nd. Certain arrangements whereby the oscillatory movement of electro-magnetic apparatus imparts a rotary motion to the index axis.—In one instance, the vibrating arm of the electro-magnet carries two conical pallets, which are situated between two discs perforated with holes; the discs (and therefore the pointer axis and pointer) are rotated by the alternate engagement of the pallets with the discs. In another instance, inclined teeth are cut upon the discs; a ratchet wheel surrounded by a toothed ring may take the place of the toothed discs.

3rd. Telegraph communicators.—Two springs, one connected to the line wire, the other to the earth, are made to revolve over "a series of alternate contact surfaces with the battery," by means of a crank and handle. The said contact surfaces consist of two rings of metal, one placed above the other and insulated therefrom; metal studs in the lower ring project through holes in the upper ring, so as to be flush with the surface of the upper ring.

4th. Communicators of step-by-step dial telegraphs "which "when acted on arrest at the proper time the flow of the electric

"currents into the telegraphic circuit."—The finger keys are arranged "in two sets one at each end of the commutator," and in a similar manner to the "touches" of the concertina. Upon depressing either of the keys, a revolving arm, attached to one of the springs of the commutator described in the 3rd improvement, is arrested, thus sending into the line-wire circuit a number of currents corresponding to the number of alternations passed over by the arm between the last letter telegraphed and that telegraphed by the above-mentioned depression.

5th. A modification of the commutator described in N° 2895 (A.D. 1855).—"The improvement consists in mounting these "commutators in two separate portions, the arrangement for "the incoming current together with the battery connections "forming one portion, and the pistons and connecting plates for "the outgoing current the other portion."

6th. A magneto-electric machine in which "two nearly semi-"circular permanent magnets" are mounted upon a centre "so "as to form a wheel of which the magnets are the periphery."—The permanent magnets do not come quite in contact, and, as the wheel revolves, prolongations from the poles of the said permanent magnets "pass over the ends of the iron cores of a series "of electric coils arranged in a circle."

7th. Constructing magneto-electric machines "with a stationary "permanent magnet," "and placing three electric coils in a row "near to its poles, one of them being put between the two poles; "a plate or disc of iron with radiating spokes is mounted on an "axis so that when it revolves the spokes pass over and in close "proximity with the poles of the permanent magnet and electric "coils without absolutely touching them." A machine with one horseshoe permanent magnet, and another with two horseshoe permanent magnets, are set forth and shown.

8th. A magneto-electric machine, having the coils, permanent magnet, and semicircular branches therefrom (similar to those described in the 1st improvement) stationary, whilst "two strips of "soft iron are so mounted on an axle" "as to bring each of the "coils into magnetic connection first with one pole and then with "the other adjacent pole induced in the said soft iron ring," when a lever is moved.

9th. Supplying ink to printing telegraphs by means of a piece of cloth, saturated with ink, inserted into an inclined grooved channel, and hanging over on to the ink roller.

10th. Forming the inking cistern of printing telegraphs "in "two distinct reservoirs, with a narrow passage connecting the "two," the said narrow passage conveying the ink from the upper cistern to the marker and from the marker to the lower cistern. The whole arrangement is mounted on centres, so that the upper and lower reservoirs may change places, or so that the reservoirs may "be turned in a horizontal position."

11th. "Arranging the galvanic batteries of electric telegraphs "with saucer-shaped vessels or annular troughs receiving zinc "and mercury," "connected to the negative element of the "next cell by means of an insulated conducting wire secured "at one end to the saucer, and in metallic connection with the "mercury therein, and at the other end to the said negative "element by a bar of wood and dovetailed wedge."

[Printed, 3s. 10d. Drawings.]

A.D. 1861, December 7.—N° 3074.

FEARN, THOMAS, and COX, THOMAS, junr.—(*Provisional Protection only.*) This invention is entitled "The application of certain electro-deposits to the coating or finishing of the stretchers, "ribs, and other metal portions of umbrellas and parasols."

The inventors state:—"Our invention consists in the application to the coating or covering (by the agency of electricity) of "the metal portions of umbrellas and parasols with tin or alloys "that will readily mix and amalgamate with tin, so as not "materially to affect the white or bright colour natural to tin so "deposited, nevertheless we purpose that tin shall form the "principle base of our deposit. The metal portions of umbrellas "and parasols thus treated will present a clean, neat appearance, "and not" [be?] "liable to corrode or oxidize, as the iron and "steel portions of such articles are now subject to."

[Printed, 4d. No Drawings.]

A.D. 1861, November 9.—N° 3078.

VARLEY, CROMWELL FLEETWOOD.—"Improvements in electric "telegraphs."

1st. Improvements on the "gravity battery" described in N° 2555 (A.D. 1854).—"The solution of the negative salt when "the battery is not in action" is retarded by using, as a negative plate, a conducting tube perforated at the lower part, "with or

" without a plate or tray, by which a larger surface is exposed to " action, and any negative salt outside the tube is not entirely " lost, but still comes into action." Plaster of Paris, "glass " cutter's mud," and other materials and arrangements, are used to increase the retardation of the solution of the negative salt when the battery is not in action.

2nd. Telegraphic insulators.—This improvement "consists in " reducing their diameter as much as possible, and so con- " structing them of two or more insulating portions, so that if one " fail to insulate the other part arrests the escaping electricity." Various materials and arrangements are described and shown for accomplishing this object; amongst the materials are earthenware, ebonite, glass, varnish, and resin. To keep the telegraph wire in its place, and to dispense with the necessity for binding, the insulator caps have hooked projections formed on them, in which the wire is clamped owing to the shape of the said projections. Where the telegraph wire passes through the tunnels or smoky places, ebonite-covered pieces of wire are inserted into the circuit at each pole or support.

3rd. Lightning conductors.—A "vacuum conductor" consists of a glass bulb, into which several platinum wires are fused, "one " or more being connected with the earth, the other or others " with the lines to be protected; one spare wire is left for testing " the vacuum." A "magnetic lightning conductor," consisting of a helix and soft iron core, may be used in addition to the vacuum conductor; "the iron requires time to magnetize, and " thus by offering momentary resistance arrests all very sudden " currents which are thus made to flow through the lightening " conductor in which there is no magnetic inertia to be " overcome."

4th. "Apparatus for indicating the locality of defects in tele- " graphic lines without algebraical or numerical calculation;" this apparatus is an improvement on that described in N° 1509 (A.D. 1859).—A differential galvanometer, switch, and key are mounted on the same board, and the requisite connections to obtain the numerator and denominator of the fraction which expresses the distance of the fault are thus made with facility; the said distance is reckoned from the extremity of a good telegraph line, of the same length as that to be tested, included in the circuit, and the above-mentioned fraction expresses that distance in comparison with the total length of the telegraph line to be tested.

The resistances necessary to bring the galvanometer to zero, in each case, are contrived in decimally-arranged resistance coils, which are brought into circuit as required by means of cams and springs.

"When testing the insulating power of a submarine or sub- "terranean line," the inventor prefers "using the static test, and "noting how long a period of time the charge in the wire is "falling from any one tension to any other." A differential apparatus for accomplishing this purpose is described and shown; it consists of a metallic non-magnetic needle, free to vibrate over certain pieces of metal which are suitably connected with the source of electricity and with the telegraphic circuit, first to charge the apparatus, then to test the wire as above mentioned.

To cut off all tremulous vibrations from the above-described and other sensitive instruments, the said instruments are supported on a heavy mass or slab which "has 3 or 4 feet or supports "made of elastic material."

[Printed, 1s. Drawing.]

A.D. 1861, December 9.—N° 3081.

MENNONS, MARC ANTOINE FRANÇOIS (*a communication from François Debons and Théobald Denny*).—(*Provisional Protection only.*) "Improvements in the production of relief designs on "metallic surfaces for general printing, gaufering, and embossing "purposes."

The polished and varnished zinc plate has the design traced upon it, and a "ground protecting solution" is laid on it; the lines forming the design are then cleared of fatty matter and "filled up by a thin sharp deposit of copper adhering perfectly to "the surface of the plate, which on being withdrawn from the "bath is freed from its varnish." The design in relief thus brought to view is then ground-etched, and the entire surface is covered with a "mineral paste," which when dry is removed from the relief lines; the said relief lines are then coated with resinous matter, and the unprotected grounds are electro-etched to a suitable depth, the "mineral paste" having been removed.

Another process, in which the "mineral paste" is dispensed with, is set forth.

The above-mentioned "thin sharp deposit of copper" is made by submitting the plate to galvanic action as a cathode in a solution

containing cyanide of copper, and the subsequent ground-etching is accomplished by making the plate an anode in a solution containing sulphate of zinc and nitrate of ammonium. In the process in which the "mineral paste" is dispensed with, when the design in relief is brought to view, "the plate may be em-" ployed to form in itself a voltaic couple;" the etching solution employed on this occasion contains sulphate of copper, sulphate of iron, sulphuric acid, nitric or hydrochloric acid, and acetic acid.

Other metallic surfaces require modifications of this process.

[Printed, 4*d*. No Drawings.]

A.D. 1861, December 10.—N° 3100.

AGNEW, John Washington (*partly a communication from Henry Palmer*).—(*Provisional Protection only.*) "A new and " improved electro-voltaic pocket battery."

" A series of any number of hollow spiral tubes are formed, " composed of zinc and platinized silver ribbons or flattened " wires, or any other of the heterogeneous metals, separated from " each other by crotchet cord or other absorbent material cal- " culated to retain moisture, so as to prevent contact between " the two metals, and these ribbons or flattened wires and the " crotchet cord are regularly and methodically twisted to the " right and to the left in alternate tubes, and the tubes are placed " horizontally parallel to one another, at a sufficient distance to " prevent contact except at their extreme ends, where the metallic " ribbons separate and diverge at right and left angles by the " heterogeneous metal of the one crossing that of the other, and " are sufficiently soldered thereon. These series of tubes are " held together on both sides by a framework composed of " narrow slats of glass or other similar material, coated with " dissolved sealing wax, and adhering to narrow strips of gutta " percha or other non-conducting material cemented to the series " of tubes." The exciting fluids act upon the interior as well as upon the exterior surfaces of the tubes.

" Twenty-one or more tubes so arranged form a wing, and two " or more wings of the above hollow spiral tubes or elements " being hinged together so as not to break contact on galvanic " principles form a battery, and one end of the zinc ribbon or " flattened wire forms the positive" [negative?] " pole, and the

"opposite end of the platinized silver ribbon or flattened wire "forms the negative" [positive?] "pole."

"When the wings are folded together the battery is most "conveniently compact and portable."

[Printed, 4d. No Drawings.]

A.D. 1861, December 11.—N° 3109.

POTTER, JOHN.—"An improved mode of jointing or con-"necting" [electric?] "telegraph wires, which is also applicable "to jointing or connecting signal wires, fencing wires, and other "wires or rods."

"The wires to be jointed or connected are passed through "separate conical-shaped ferules or blocks, and a rivet head is "then formed at the end of each of the wires. This will prevent "the wires from being drawn back out of the ferules or blocks. "Both the ferules or blocks are hollowed to admit of the wire "passing through, and one of them is provided with a male "screw, the other with a female screw, into which the male screw "enters. Behind the thread of the female screw and within the "ferule is a chamber or socket to admit the rivet heads of both "the wires. When the two ferules or blocks are screwed "together the rivet heads of the wires within the socket are "pressed or drawn into contact, thereby forming a continuous "length of wire or strand, whilst the ferules or blocks them-"selves form a close fitting joint."

"As a modification of the above mode of construction the "rivet heads may be dispensed with, and the ends of the wires "simply upset or bulged out to such an extent as will prevent "them from being drawn out through the ferules or blocks."

[Printed, 6d. Drawing.]

A.D. 1861, December 12.—N° 3111.

SEARLE, RICHARD.—"Improvements in the treatment, pre-"paration, and combination of metals used for sheathing ships "and marine erections, also for roofing buildings and other "purposes."

1st. "The application of zince amalgamated or treated with "mercury, or of iron coated with zinc, commonly called gal-"vanized iron, amalgamated or treated with mercury, to "sheathing of ships and marine erections, buildings, and other

"purposes, also for the preparation in like manner of bolts and "nails and other fastenings used in building or sheathing ships "or marine erections, or for covering or roofing buildings, or for "other purposes, particularly those to which copper, yellow "metal, galvanized iron, or zinc in its unprepared state have "hitherto been applied." "When the zinc or other metal so "prepared is applied to the sheathing of ships," the inventor places "a portion of copper, either in partial or absolute contact "with it, *in such a manner as to produce a weak galvanic circuit*, "the strength of the current being determined by the relative "proportions of the two metals so employed.'"

2nd. "A method of keeping the bottoms of iron ships or vessels "clean by the application of such proportions of copper" "or "brass" "to their internal or external surface *as shall cause a* "*weak galvanic action*, but not sufficient to exercise a destructive "influence upon the metal of which they are composed."

[Printed, 4*d.* No Drawings.]

A.D. 1861, December 14.—N° 3144.

KOHN, Ferdinand.—(*Provisional Protection only.*) The title of this invention is "An improved mode of copying writings, "drawings, prints, and similar objects."

The inventor states:—"My improvement consists in passing "an electric current through a great number of sheets of paper, "or any other suitable material, piled upon each other and "impregnated with substances capable of producing a coloured "stain on the paper at any place where the electric current "passes through the same.

"A substance of this kind is the nitrate of silver, dissolved in "distilled water, but any other chemical compound or mixture "possessing similar electric properties may be used instead of the "above. The said sheets, being placed upon a metallic plate, "connected with one pole of the electric battery, and being kept "sufficiently damp for conduction, I connect the metallic pen or "type with the other pole of the battery, thereby producing the "exact copy of the writing, drawing, or printing made upon the "upper sheet simultaneously on all the sheets.

"Drawings, prints, and photographs, if so prepared that the "coloured or shaded parts be non-conductors of electricity, while "the uncoloured part of the original is kept damp, and thereby

"capable of conducting an electric current, or if made with an "ink composed of conducting materials on a non-conducting "surface, may be copied by the same method."

[Printed, 4d. No Drawings.]

A.D. 1861, December 17.—N° 3161.

BUNNEY, JOHN BICKERTON, and WRIGHT, THOMAS.—(*Provisional Protection only.*) "Improvements in ornamenting "metallic and non-metallic bedsteads and other articles made "principally of metallic rods or tubes."

This invention consists in casting on, or "casting and after-"wards fixing on the parts to be ornamented ornaments of zinc "or other hard and cheap metal or metallic alloy, and afterwards "coating the said ornaments with brass or silver, or other "metal or alloy." The said metallic coating is effected "*by* "*electro-deposition.*"

"In ornamenting the pillars of metallic bedsteads we make a "mould having internally the figure of the ornament to be pro-"duced, the said mould being in two or more parts, which may "be temporarily fixed together upon or around the pillar. We "place the pillar in the said mould, and pour the melted metal "or alloy into the said mould and thereby cast the ornament "upon the pillar."

"In ornamenting the head and foot rails of metallic bedsteads "we bend the rods into the required shape and lay them in chill "boxes or moulds, and cast the ornaments in the said moulds. "We cast the said ornaments by preference of zinc, or of an alloy "of tin and lead and zinc, but any hard easily fused and cheap "metal or alloy may be used. We coat the ornaments with brass "or silver, or such other metal or alloy as may be reduced *by the* "*processes of electro-deposition;* or the said ornaments may be "finished by painting, or gilding, or japanning."

[Printed, 4d. No Drawings.]

A.D. 1861, December 18.—N° 3170.

DICEY, WILLIAM.—(*Provisional Protection only.*) "Improve-"ments in submarine electric telegraphic cables."

This invention "has reference to the covering or protecting of "the 'core' which may be either of the ordinary or of any "approved construction;" and the invention "consists in effect-

" ing, or constructing the covering by ribbons or strips of metal, " applied or laid upon the core in a longitudinal direction not " perfectly in line therewith, but with a small amount of uni- " formly spiral twist around the core, and with one edge of each " ribbon or strip overlapping one edge of the next or adjoining " ribbon or strip. The ribbons or strips may be of copper or " Muntz's metal, or other suitable metal, and three or four may " be employed; it is believed this number will be convenient for " ordinary sizes, but the number may be varied according to " circumstances. It is proposed to secure the ribbons or strips " laid as above set forth by two or more narrow binding strips of " metal or other suitable material, also applied spirally, but in " the opposite direction to the first covering, or by a wire, or " hempen, or other convenient binding."

"The objects are to secure (more or less according as the " details are varied) strength, lightness, elasticity, freedom from " liability to kinks, and protection from decay in salt water."

[Printed, 4*d*. No Drawings.]

A.D. 1861, December 20.—N° 3203.

LE SOUEF, DUDLEY CHARLES (*a communication from Henry Kündig, George Bertschy, and Joseph Porges de Portheim*).—" An " improvement in cylinders used in printing calicoes and other " textile fabrics."

" This invention consists in coating or covering cast-iron " cylinders with copper by means of any of the well-known pro- " cesses of electro-plating iron with copper. The copper surface " thus produced on the iron cylinder or roller is then engraved " with the desired pattern or design, and used in place of the solid " copper rollers hitherto employed for printing calico and other " textile fabrics.

" The advantages of these rollers in addition to the great " economy of production, consist in the purity of the copper, " which renders it particularly well adapted for engraving and " etching, the design being more permanent than on the less per- " fect surface of the ordinary copper rollers. When the rollers " are turned for the purpose of preparing them for a new design, " they can be maintained at exactly the same diameter by giving " them a new coating of copper at a trifling expense."

[Printed, 4*d*. No Drawings.]

1862.

A.D. 1862, January 1.—N° 11.

RHODES, BENJAMIN.—" Improvements in forming or making " straight and bent pipes and bends for pipes, and also vessels " of various shapes, and in coating and protecting objects and " articles of various forms, and in the apparatus to be employed " therein."

This invention consists " in employing elastic fabrics in combi- " nation with bitumen or bitumenous mastics or compositions " for the above-mentioned purposes, and in order to render the articles coated " more perfect non-conductors of electricity." The said elastic fabric, circular in form, is drawn over a core piece of the requisite pattern, and the core thus surrounded is dipped into the bituminous composition, a second elastic coating drawn on and the whole dipped, and so on until the requisite thickness is obtained. In making long pipes two hollow pressure cylinders are used in contact with the core, " so that the core or " mandril and its covering is uniformly supported throughout its " length ;" a third roller is arranged so as to squeeze out all the superfluous bitumen.

" For the purpose of coating various articles with a water-proof " covering or envelope, and also for the purpose of better insulat- " ing and preserving telegraph posts, I apply an envelope of " elastic material in combination with bitumen, simlarly applied " and as before described."

[Printed, 8d. Drawing.]

A.D. 1862, January 8.—N° 58.

COOK, HENRY (*a communication from Gaetano Bonelli*).— " An improved mode of and apparatus for transmitting despatches " and small articles by the agency of electricity."

This invention consists of " the application of the tractive " power of electric coils to cause an armature of iron, constructed " in the form of a hollow vessel, casing, or carriage, (made to " contain articles of various kinds,) to pass along a continuous " line of rails placed within, and extending throughout a series of " tubular electric coils."

"The two extremities of each coil are open throughout, and in "the tube is placed a small carriage with an iron casing and "containing a battery. When the carriage which is made to "rest on the rails at the bottom of the tube has been introduced "for one-third of its length into the first coil which surrounds "the tube, a momentary contact is established with the two ends "of the coil, by means of springs which are in communication "with a battery contained in the same carriage. An electric "current is thereby set up in the coil, and this current gives an "impulsion to the iron carriage, which is obliged to advance "not only into the coil, but also to continue along a portion "of the tube beyond the coil, owing to the velocity it has "acquired. The distance traversed in this manner being calcu-"lated, the carriage will be found to have penetrated into the "second coil, where, by the electric current therein induced, the "carriage will receive a second impulsion which will oblige it to "run into the third coil, and so on, gradually augmenting its "speed until it reaches a high velocity, and is carried from end "to end of the tube."

[Printed, 8*d*. Drawing.]

A.D. 1862, January 9.—N° 59.

SIEMENS, Charles William (*partly a communication from Dr. Werner Siemens*). — "Improvements in the means and "apparatus employed for insulating and protecting telegraph "conducting wires, and in apparatus for working the same."

1st. Insulating and protecting conducting wires and constructing telegraphic cables. — A strand of several wires is passed through "Chatterton's compound," then through cold water, and covered with India-rubber, as set forth in N° 2503 (A.D. 1859), "and afterwards with one or more coatings of gutta percha, "with or without intermediate layers of Chatterton's mixture or "other suitable compounds."

"In making joints in the india-rubber covering of conducting "wires," the conducting wires themselves are first joined, and th uncovered part of the wire is overlapped with India-rubber stips; the joint is then placed in a long deep metallic semicirular groove of the size of the covered wire, and a slide being

pressed into the said groove by means of screws, and the whole exposed to heat, "the india-rubber covering is made to assume "permanently the cylindrical form of the mould."

The machines employed to manufacture telegraph conductors or cables combine apparatus for effecting helical coverings of fibrous material; "alternately right or left-handed," with apparatus for helically lapping "a flexible metallic sheeting" upon the said conductors or cables. The fibrous material is supplied from reels mounted upon a hollow shaft, through which the core is made to pass uniformly. The above-mentioned metallic covering is made "a tight cylindrical and overlapping sheathing" by means of a sliding or rolling pressure brought to bear upon the metallic strips whilst the overlap takes place.

2nd. Improvements in Morse receiving instruments.—"The "marking or writing disc is attached to the oscillating lever or "other mechanism in connection with the armature of the electro-"magnet employed, which disc has a continuous independent "rotary motion imparted to it by the clockwork in the opposite "direction to the motion of the strip of paper." When ink is used, an adjustable ink reservoir supplies the ink, and a scraper removes the superfluous ink from the circumference of the writing disc.

3rd. "Constructing magneto-electric transmitting apparatus for "step-by-step instruments, by mounting an iron bar with deep "longitudinal grooves containing insulated wire upon a spindle; "which spindle admits of rotation in one direction only between "a series of poles of permanent magnets."

4th. Constructing electro-magnets, "employed either for "relays or for other receiving instruments."—A permanently magnetic spindle is mounted at one extremity in the neutral portion of the electro-magnet, and carries a "tongue" or armature at its other end, which is thus made to oscillate between the poles of the electro-magnet. The spindle of the armature may be made of considerable dimensions, and a large piece of iron may be attached to the neutral part of the electro-magnet; these masses of iron "act as reservoirs for the residuary magnetism."

5th. The arrangement of magneto-electric transmitting instruments, wherein "the transmission of currents is regulated by the "action of finger keys upon a rotating cylinder in connection "with the armature, which cylinder at the same time receives a

"reciprocating motion in the direction of the axis upon which it "revolves."

6th. Regulating telegraphic clockwork.—The angular position of certain fly vanes is determined by two opposite forces; the centrifugal force tends to place them at right angles to the axis, and an adjustable spring (acting through levers) tends to keep them parallel to the said axis.

[Printed, 8s. 4d. Drawings.]

A.D. 1862, January 10.—N° 77.

PREECE, WILLIAM HENRY.—"Improved apparatus for signal-"ling upon railways."

The telegraphic signals used in the working of railways are assimilated "to the visible line signals used" "by adapting to "telegraphic instruments a semaphore arm or disc or other "indicator" which is operated "by electro-magnetic power."

When the electro-magnet of the signal instrument is excited, it elevates the semaphore arm to a horizontal position by means of an armature lever which raises a vertical rod, the vertical rod acting directly upon a pinion on the axle of the arm by a rack at the extremity of the said vertical rod.

There is a similar set of instruments at the departure and arrival stations; these consist of a bell instrument, a signal instrument, a transmitting key, a switch, and two galvanic batteries, one to work the bell and the other the signal instrument. If a train is about to start from the departure to the arrival station, the finger key, depressed at the departure station, sounds the bell at the arrival station, and the semaphore arm at the departure station is raised by the operation of the switch at the arrival station; the raising of the said arm completes an electric circuit which again sounds the bell at the arrival station, intimating that the semaphore arm at the departure station is raised. The semaphore arm continues elevated until the train has arrived at the arrival station, when the switch at the arrival station is restored to its normal position. If a train passes in the opposite direction the other semaphore is worked in a similar manner.

A semaphore apparatus with a clock movement is described in the Provisional Specification.

[Printed, 1s. 4d. Drawings.]

A.D. 1862, January 10.—N° 79.

KENYON, John, and HORN, Archibald. — (*Provisional Protection only.*) "Improvements in railway signalling by elec-"tricity, and in the arrangement of apparatus for that purpose."

"Our improvements in signalling consists in laying down on "lines of railway a system of telegraph wires and terminals "acting in conjunction with batteries, and signalling apparatus "carried by the train, in such manner that each passing train "shall leave an indication of its presence, if within, say, two or "three miles, whereby to indicate that the line is interrupted, and "shall also, on exceeding that limit, remove the indication of its "presence, and thereby denoting the line clear to the succeeding "train."

"To effect this we arrange and dispose terminal or contact "points in pairs, the several pairs being at distances from each "other, say, of half a mile or a mile. These we unite in alternate "pairs by suitable wires or electrical connection, that is to say, "the first is so united to the third, and the second to the fourth; "again, the third is connected to the fifth, and so on. These ter-"minal points are so exposed, that they effect contact with suit-"able contact points in the circuits of two independent batteries "carried, say, in the guard's van of each train. In the circuit of "one of these batteries there is an electro-magnet and signal bell "in the guard's van, while the other battery at the proper time "actuates an electro-magnet at the contact points on the line for "the purpose of breaking or interrupting the electrical connection "of those contact points. In order to establish the electrical "connection of those points we employ the mechanical effect of "the train at the time of passing them."

[Printed, 4*d*. No Drawings.]

A.D. 1862, January 21.—N° 153.

BINKS, Christopher.—"Improvements in generating steam, "in superheating steam, and in apparatus employed therein."

1st. The direct application "to water for its vaporization or "conversion into steam when such steam is to be generated in "close vessels or boilers," "of the products of the combustion in "atmospheric air of carbonaceous fuel."

2nd. The direct application to water "of the heat developed by "the combustion of certain gases when their combustion is made

" to take place whilst in actual contact with the water," in order to convert the said water into steam; or the combustion may take place out of immediate contact with the water, and the heat thus evolved be applied directly to the water. The gases used are oxygen and hydrogen, and their ignition and combustion can be effected "by the agency of common electricity, or of magneto, or of " voltaic electricity, that is, by exposing the mixture to the action " of the spark from the two former, or to that of a platinum or " other wire heated by the latter."

3rd. The use of superheated steam as the source of heat to effect the conversion of water into steam; such superheated steam being " brought into actual contact with, the water to be " vapourized."

4th. The conversion of water into steam by a portion of it being electro-decomposed, and by the heat, subsequently evolved from the recombination of the gases by electric means. The decomposition of the water and recombination of the gases may either be "alternate, successive, or simultaneous," and the gases, when ignited, may be in direct and actual or in proximate contact with the water to be vaporized. The decomposing electrodes are connected with receptacles for the eliminated gases through which electric sparks are made to pass, or in which platinum wires are fixed.

[Printed, 6*d*. No Drawings.]

A.D. 1862, January 21.—N° 161.

HENRY, Michael (*a communication from François Victor Guyard.*)—" Improvements in the mode of and apparatus for applying electricity to horology."

The electric current is only used periodically to correct the clocks, which are kept going in the ordinary manner, and the electric current need not act simultaneously on all the clocks under control, but only upon so many as can be acted upon conveniently by a single current.

The clocks to which this invention is applied are regulated so as always to gain slightly, and, when the time arrives at which they are to be electrically regulated, they are "stopped for a very short " interval to await the transmission of the regulating current, " which allows of their setting off again at the exact moment."

An electro-magnet, excited by the regulating current, removes a

stop-lever when the time for the starting of the clock again has arrived, the said stop-lever acting upon the minute hand or other axis just before the transmission of the current; when the regulating current has circulated, the stop resumes its normal position ready to act upon the axis just before the next transmission of the regulating current. Each batch of clocks is regulated at a different part of the hour or other periodical time.

Each of the clocks regulated may be made secondary regulating clocks, if they have suitable extra contact points besides those for the main regulating current, the said extra contact points being " connected with a second conductor, through which a current " wholly distinct from the principal or main current is con- " tinuously sent."

[Printed, 4d. No Drawings.]

A.D. 1862, January 24.—N° 188.

MORRIS, TIMOTHY, WEARE, ROBERT, and MONCKTON, EDWARD HENRY CRADOCK.—"Improvements in submarine and " other telegraphic communication, and in apparatus connected " therewith."

This invention consists "in the application of electric light, " however generated, to the purpose of producing signals and " communicating intelligence."

The apparatus consists of one or more glass vacuum tubes, variously shaped and coloured. "By causing the electric current " (by preference produced and induced by means of our batteries " and induction coils) to pass through the tubes in one direction " we produce a light or lights of a certain color or colors, and by " reversing or otherwise changing the direction of the current, we " produce a light or lights of a different color or colors. By a " suitable arrangement with regard to the production and re- " petition of these various colored lights in the tube or tubes or " vessels, a code of letters, words, or signals may be established, " and submarine, aerial, or underground telegraphic communica- " tion effected."

The vacuum formed in the above-mentioned tubes may be either a simple vacuum or a vacuum formed after the admission of certain gases or vapours to the said tubes. "The tubes are " then to be hermetically sealed, when they will continue constant " in their action, and variously-colored lights will also be pro-

" duced by the passage of electricity through them. The tubes " or vessels may be furnished with glass letters of various colors " fixed thereon, or entire words and sentences, in order to afford " signals."

[Printed, 4d. No Drawings.]

A.D. 1862, January 25.—N° 194.

WEST, Charles.—" Improvements in the insulation and cover- " ing of wire, and in the preparation of the materials for insu- " lating the same."

Native South American India-rubber is prepared as follows: — " I prepare the rubber by boiling it in water, with or with- " out any other mixture, or by steaming it after it has been cut " into ribbons or strips from the bottle or block. After boiling " or steaming it, I then allow the moisture to evaporate until the " rubber is perfectly dry. In this state I place it round the wire " in one or more coatings. The rubber so prepared will then be " open to the action of the solution I purpose applying to it " while placing it round the wire, which solution will consist of " india-rubber dissolved in benzoin, naptha, turpentine, or any " of the other solvents of india-rubber, either in combination or " singly. I place a trough over the wire, through which I allow " the solution to percolate on the wire or on the rubber just as it " enters the mandril, with a receiving dish underneath to catch " such of the solution as may fall from the passing wire or " rubber. After passing through the mandril, the wire or rubber " thus saturated with the solution receives the rubber to be " wound upon it from the reel or bobbins as it revolves round " it, & the tension at which the rubber is placed round the wire " at each revolution of the reel or bobbin presses the solution " through the interstices of the overlapping, & thus unites it " into one solid tube."

This system of insulation may also be applied to gutta-percha-covered wire, and to the preparation of the fibrous material used in the outer covering.

N° 2321 (A.D. 1858) is alluded to in this Specification.

[Printed, 4d. No Drawings.]

A.D. 1862, January 27.—N° 208.

HARRISON, Charles Weightman.—" Improvements in " printing, stamping, embossing, perforating, and other like

"operations, and in the machinery or apparatus employed "therein."

In the case of the printing press, the tympan, when brought into its proper position over the printing surface, "is drawn "forcibly down to give the required printing pressure by means "of suitably disposed electro-magnets or electro-magnets and "keepers or coils of conducting wire." The Drawing shows an arrangement in which the platten is mounted on an axis between two forms of type, and, when the platten is brought down upon the inked form, the electro-magnets become excited and impress the paper which has been previously placed on the said form; the other form is then inked, the platten turned over, and the paper thereon impressed in a similar way, and so on. Instead of the above-described arrangement, two plattens, connected by chains and working in guides, may be used.

Inking rollers are mounted at the extremities of arms, connected with an axis, which is made to turn when required by means of armatures at the extremities of other arms, the said armatures being moved by means of fixed electro-magnets, so as to force the rollers against the type. By this arrangement "impressions in a great variety of colors may be produced with "great rapidity."

In the percussive machines above alluded to, the stamping, embossing, or perforating hammer is mounted on an axis, which is worked by means of the armature of an electro-magnet, the said armature being fixed at the extremity of a lever, the fulcrum of which is the axis of the hammer. The current is made and broken at each stroke of the hammer; the strokes are thus given by self-acting means and with great rapidity.

[Printed, 10*d*. Drawing.]

A.D. 1862, January 27.—N° 212.

ROBOTHAM, Thomas John, and HACKNEY, Nathan.—(*Provisional Protection only.*) "Improvements in purifying slip, "glaze, and other potters' materials."

"Heretofore it has been proposed to purify slip, glaze, and "other potters' materials by passing them through a narrow "trough in which are placed a series of electro-magnets for the "purpose of extracting any iron or other magnetic substances "incorporated with the materials, but the apparatus has been so

"arranged as to carry the slip, glaze, and other materials so "rapidly out of the province of the magnets, that the clearing "is but very imperfectly effected by them. Now our invention "consists in causing the slip, glaze, or other potters' materials "to pass through a box divided into compartments by partitions, "in one end of each of which partitions holes or passages are so "formed that the materials being fed into a compartment at one "end of the box, may pass successively through each of the "compartments, and the passages are formed at alternate ends of "the partitions, so that the materials are caused to pass from "end to end of each compartment, and the materials pass away "from the bottom of the last compartment through a pipe, in "in which is a tap to regulate the flow of the materials. In each "compartment are placed two or more 'horse-shoe' electro-"magnets, and the magnets are placed so that their poles alter-"nate, and the magnets in all the compartments are worked "from one battery, the wires from like poles of the magnets "being all connected together."

[Printed, 4d. No Drawings.]

A.D. 1862, January 29.—N° 236.

HARBY, JAMES BENJAMIN.—The title of this invention is "An "improved method of preserving electric telegraph cables and "wires."

The inventor states :—"My invention consists in impregnating "or coating the yarn or textile fabric or fibres employed in the "manufacture of electric telegraph cables with a composition of "solution of caoutchouc, resin, and powdered chalk, the pro-"portions of the materials being varied according to the pliability "required when the composition is set. In some cases I mix "with the composition arsenic or other poison to guard against "the attacks of fish, insects, and animals.

"My invention also consists in coating the conducting wires, "whether in submarine, subterranean, or suspended telegraphs, "as also complete cables, and the separate wires composing the "cable, with the said composition, which I apply in a heated "state."

[Printed, 4d. No Drawings.]

A.D. 1862, January 31.—N° 261.

HARGREAVES, JOHN.—(*Provisional Protection only.*) "Im-"provements in the manufacture of pipes or tubes for conveying "water, gas, acids, sewage, *enclosing electric telegraph wires*, and "for other purposes; which improvements are also applicable to "the manufacture of other vessels and articles, and in the "machinery or apparatus connected therewith."

1st. "Combining and treating various materials or substances," so as to convert them "into a bituminous mastic." The following ingredients may be used:—"Bitumen, cement, chalk, clay, "flint, lime, oyster, and other marine shells, river or other sand, "slag," "slate," "the refuse and short waste of cotton, worsted, "wool, hemp, flax, tow, jute, cocoa-nut fibre, and other fibrous "materials, gutta percha, caoutchouc, gums, and oils." The solid materials are dried, pulverised, mixed, and heated; a certain portion of the powdered mixture is then added to a composition of melted bitumen with "the waste of gums, oils, and fibre," and incorporated therewith.

2nd. Improved machinery for manufacturing the above-mentioned articles from the "improved bituminous mastic." The bituminous mastic is forced out of a steam-heated cylinder through a suitable die by means of a piston; the moulded bituminous mastic rests upon a "counterplanced" [counterbalanced?] "platform below, which descends by its pressure until the pipe "or other article is formed of the required length and size." By means of certain passages on the bottom of the cylinder, a current of cold air or water reduces "the temperature of the bituminous "mastic on its passage through the orifices of the die or mould."

[Printed, 4d. No Drawings.]

A.D. 1862, January 31.—N° 264.

MONCKTON, EDWARD HENRY CRADOCK.—"Improvements "in the application of electricity for obtaining ammonia and "other useful products during the combustion of coal and fuel, "and in the apparatus employed therein."

The electric current is continuously applied to the coal or other fuel in the furnace "by means of wires and iron rods or chains, "or pieces of graphite or plumbago;" a blast of steam and air is then made to play "over and among the electrified coke or

" fuel, and a decomposition and recombination of elements takes " place." Thus ammonia, carbonate of ammonium, sulphate of ammonium, and other simple and compound products, such as nitrogen and cyanogen, are said to be formed, and it only remains either to collect them in suitable vessels or to make them enter into further chemical combinations, " as is now ordinarily done." " The materials to be further acted upon are to be subjected to a " continuous and incessant action of electricity on them, as they " are made to pass through suitable channels."

Gases may " be generated and separated by any suitable means, " and be brought into contact with the decomposed products of " the electrical bath, and the character of the electricity employed " be itself varied by being conducted through chemicals properly " insulated prior to its introduction into the electric bath."

When ores are smelted, the electric current would be likely to form sulphuric acid rapidly. In special cases, charcoal, electrically prepared, may be used, and the decomposition may be effected by electricity alone without the employment of fuel.

This process is also applicable to the reduction and fusion of intractable ores or metals, for example, the reduction of aluminum from aluminous clays.

The most suitable form of electric force is to be employed.

[Printed, 4*d*. No Drawings.]

A.D. 1862, February 4.—N° 289.

DE MESCHIN, THOMAS, formerly MEEKINS, THOMAS MOSSOM.—This invention is said to be for " The production of a projectile and explosive force to be used in instruments of war; for " an electric gas gun and electric gas shell; for a method of using " the recoil of weapons; for the purpose of increasing the pressure " of elastic fluids; for the production of a projectile force; for a " method of rapidly loading weapons at the breech; and of a " motive force to be used in an electric gas engine or other " engines."

Attached to the breech of the gun is a gas generator, in which oxygen and hydrogen gases, from the electro-decomposition of water, are evolved; the said gases are allowed to accumulate until a high pressure is attained, and, after they are admitted to the barrel of the gun by mechanical means, the shot—when it passes over a certain point in the bore—completes and breaks an electric

circuit, thereby closing the aperture in the gas generator. When the above-mentioned aperture is completely closed, " an electric " current is established, which passes through a strip of platina in " contact with the gases of the barrel, and thereby effecting their " explosion."

In the electric gas shell, the above-mentioned gases are forced therein at a very high pressure, and, on striking an object, an electric spark is elicited which explodes the shell.

In the motive force apparatus, the gases are introduced into a cylinder at a high pressure, and, after impressing upon a piston (in the cylinder) the force due to their tension, are mixed and detonated in the cylinder.

The heat produced by the burning of the gases may develop thermo-electricity, to assist in decomposing water; the voltaic electricity, developed by the combination of the gases, may also assist in decomposing water in the gas evolver. These points are not mentioned in the Final Specification.

[Printed, 4d. No Drawings.]

A.D. 1862, February 10.—N° 340.

DICKSON, James.—" Improvements in voltaic apparatus, and " in the production of voltaic electricity."

The principal improvements to which this invention relates are " the application of heat " " to the materials employed in the pro- " duction of voltaic electricity," and " the arrangement of parts " in the apparatus," " constructed in such a manner as to admit " of the application of heat to the materials employed."

The application of heat enables certain cheap materials to be used for the production of electric force. Iron, zinc, lead, or carbon may be employed as positive plates, and carbon, platinum, copper, platinized iron, subsulphide of copper, or various alloys of copper may be used as negative plates. The electrolytes next to the positive plates, are aqueous solutions of the sulphides of the alkalies or of the alkaline earths, also aqueous solutions of alkaline salts, and, sometimes, dilute acids. The electrolytes next to the negative plates are, oil of vitriol of various densities either alone or holding certain oxides or salts in solution, solutions of other acids or salts charged with chlorine or sulphurous acid, or solutions of the nitrates and nitrites of iron or copper in combination with other acids or salts.

The heating arrangements consist either of gas jets, steam chambers, or furnaces, to the action of which the cell or cells is or are exposed, arrangements being made, by means of suitable covers and outlets, to prevent the boiling over of the solutions.

In some cases, either a single porous cell may be used in each pair, or a "double porous cell," having dilute sulphuric acid for the third or intervening liquid.

Many details are set forth in this Specification.

[Printed, 1s. 4d. Drawing.]

A.D. 1862, February 11.—N° 359.

JOHNSON, Richard.—"Improvements in welded wires used "for telegraphic and other purposes."

"My invention has for its object the strengthening of those "joints which are produced by welding, and the maintenance of a "continuity should the welding give way. These advantages I "propose to attain by protecting the said joints with a metal "covering, and this I form by welding wire or other such mate-"rial around the joint, so that should the welding break, the said "wire will still constitute a connexion or conducting medium. "By a subsequent process of galvanizing the whole becomes "soldered together."

Wire is coiled around the weld, "and for some distance on "each side thereof;" the said wire "may be round, flat, or of other "suitable form." "By the above-described arrangement the "junction of the wires is materially strengthened, and one object "of my invention is thereby attained; but supposing that the "said wires separate at or near the welded part, then the protect-"ing wire" "will be drawn out in a spiral form," "and the "continuity will be preserved, so as to afford the conducting "medium required for telegraphic purposes.

"My invention is, however, also applicable to other cases in "which welded wires are used, such for instance, as wire fencing."

[Printed, 6d. Drawing.]

A.D. 1862, February 14.—N° 397.

DODSON, Arthur John. — (*Provisional Protection only.*) This invention is entitled "An improved composition for coating, "covering, or protecting ships' bottoms; applicable also for "coating or covering railway sleepers, telegraphic wires, and

"other surfaces, and likewise as a cement, and as a substitute for "metal for certain constructive purposes."

"My invention consists in the manufacture of a composition "suitable for the foregoing purposes, by combining pulverized "slate with vegetable or mineral pitch. Instead of using the "slate pulverized I sometimes take it in an otherwise consi- "derably reduced or divided condition.

"The proportions I mostly recommend, without, however, re- "stricting myself thereto, are as follows:—Two-thirds slate to "one-third pitch. I sometimes combine tar with the pitch."

[Printed, 4d. No Drawings.]

A.D. 1862, February 15.—N° 404.

JOHNSON, John Henry (*a communication from John Henry Koosen*).—(*Provisional Protection only.*) "Improvements in "electro-magnetic timekeepers."

1st. A "galvanic chronometer."—The wheelwork of this chronometer is actuated by a rotary electro-magnetic engine, in which "the accelerating force acts nearly uniformly in all phases of its "rotation," and, "no intervals of suspension of the acting power "can interfere in any part of the revolution." The electro-magnetic engine consists of three vertical electro-magnets, "so "disposed that their six poles will form points equidistant from "each other in a horizontal circle," together with a vertical driving axis, which carries two soft-iron bars or armatures at right angles to one another. By means of a wheel commutator, on the said vertical axis, the galvanic current is admitted to the coils of the electro-magnets in succession, and the poles of the said electro-magnets being alternate in the circle, the soft-iron bars are acted upon, and the driving axis is rotated thereby.

2nd. A "centrifugal regulator."—A steel rod is pivoted at its centre of gravity upon an axis, the bearings of which are "in a "metal ring secured to and encircling the vertical main axis "centrically." "To the lower end of the steel rod is attached a "brass wire," which ordinarily connects one battery pole to the commutator spring or rod; "to the upper end of the steel rod is "connected, by means of a fine platinum wire, one end of a thin "steel blade spring, the other end of which is secured into the "supporting ring of the regulator." When the driving axis revolves, the steel rod tends to assume a horizontal position, and

thus to break the electric circuit; the reaction of the blade spring, and the adjustment of weights on the steel rod, keep the circuit unbroken until a given velocity is attained, and thence establish a uniform rate independent of the strength of the battery current.

[Printed, 4d. No Drawings.]

A.D. 1862, February 15.—N° 413.

CHATTERTON, John, and SMITH, Willoughby.—" Im-" provements in telegraph cables."

1st. Coating each iron or steel external protecting wire, or strand of wires, or strip, "with lead or other soft metal incor-" rodible in sea water."—An ordinary hydraulic lead-pipe-making machine has a hollow mandril "of sufficient length to reach " nearly to a steel die, which forms the outer diameter of the lead " covering, and in the centre of which the said mandril acts as a " guide to keep the iron or steel wire intended to be covered " concentric." The wire may be tinned or passed through marine glue immediately before it enters the lead-covering machine.

2nd. Coating strands of wires with a suitable compound and then with gutta percha.—Each strand passes through a vessel containing the adhesive compound described in N° 1811 (A.D. 1858), and thence through an ordinary gutta-percha-covering machine and cooling trough. Instead of the gutta percha coating, a compound containing marine glue and fibrous material may be used; the strand is passed through "a vessel fitted with suitable guages or " dies," and containing the mixture, "and then goes into a cool-" ing tank." Sometimes marine glue with or without the fibrous material is used, and, as soon as the strand has received a coating of the compound, tape is applied by means of an ordinary taping machine; the strand thus treated need not be passed through the cooling tank. "A second coating of tape may be simultaneously " applied. The strands of wires coated by any of the methods " herein described are then laid around the insulated conductor " or conductors by the usual cable-making machines."

[Printed, 4d. No Drawings.]

A.D. 1862, February 19.—N° 447.

BOUSFIELD, George Tomlinson (*a communication from John Welton Wilcox*).—" Improved modes of protecting iron boilers, " tanks, and vats from wear arising from galvanic action."

1st. "Interrupting the galvanic action which is produced in "iron boilers, tanks, vats, &c., by their connection with pipes, "pumps, condensers, faucets, or other fixtures of brass, copper, "or other metals electro-negative to iron, by the use of insulating "joints, by which the two metals are separated by a packing of "india-rubber or other non-conducting substance." In the case of flanged pipes, the packing employed consists of an India-rubber ring between the flanges, and another between one of the flanges and the nuts of the bolts; each bolt is covered with an India-rubber tube.

2nd. "Purifying the water before it passes into the boiler, tank, "or other iron vessel, of the copper or other metallic salts which "it may hold, by passing it through a vessel containing zinc or "its equivalent in galvanic properties." The Specification describes and the Drawings show a vessel nearly filled with zinc bullets, having an upper plug to introduce the bullets, and a lower plug "to withdraw them when it becomes necessary to clean "them;" there is also a lower inlet aperture and an upper outlet aperture for the water to be purified. "The zinc bullets may be "cleansed by shaking them in a basket, box, or revolving cylinder "for about five minutes, and then rinsing them with water."

Besides the galvanic action produced by the contact of water or steam with the iron of the boiler and with its brass fittings, the inventor states that thermo-electricity is excited wherever a surface condenser is used, and that the said thermo-electricity "is an "active agent in producing the copper salts above described."

[Printed, 8*d*. Drawing.]

A.D. 1862, February 20.—N° 452.

WILKIE, David.—(*Provisional Protection refused.*) The title of this invention is "A ships' compass, which is not to be effected by "local attraction or deviation, to be used by sailing vessel or "steamer."

The inventor states this invention to be "composed of two "bowls or kettles, one within the other, to be made of various "sizes, leaving a space between the two bowls or kettles for a "fluid or body extracted from porpis, or other fish, the inner bowl "or kettle to be connected with the outer bowl or kettle, with "the above fluid or body, and by four non-conducting peices."

[Printed, 4*d*. No Drawings.]

A.D. 1862, February 20.—N° 458.

CHURCHILL, Lord Alfred Spencer.—(*Provisional Protection only.*) "Improvements in electric telegraphs."

According to this invention, two wires are employed "to pro-" duce a single sign on the indicating instrument; one to carry "the outgoing and the other the incoming current. These wires "are caused to take different routes, so that the distance between "the outgoing and incoming wire may be considerable, and the "wires are uninsulated."

The "outgoing" and "incoming" wires of submarine telegraphs have "a thin coating of gutta percha or other insulator; "and, I prefer, in long lines, to make communications between "the water and the wire at distances apart for the purpose of dis-"charging from the wire into the water any electricity of high "tension which in the course of signalling may be induced in "the wire.

"In submarine telegraphing I prefer to employ wires larger "in sectional area than those commonly employed; and I prefer "in telegraphing with telegraphs constructed according to my "invention, and where the line is long, to employ a number of "batteries, each connected separately with the wire, that is to say, "so that each battery pours its electricity separately into the wire, "and is not coupled with the other batteries.

"In some cases where the distance to which signals have to be "conveyed is long I introduce batteries at intervals into the cir-"cuit, so as to reinforce the current. These batteries I place at a "distance from the communicating station; the signals are then "given by breaking the electric circuit."

[Printed, 4*d*. No Drawings.]

A.D. 1862, February 21.—N° 468.

SMITH, Spencer.—(*Provisional Protection only.*) "Improve-"ments in electro-magnetic engines for obtaining and applying "motive power."

This invention consists "in a novel mode of arranging, dis-"posing, mounting, and working soft iron cores or magnets, and "other moving parts of electro-magnetic engines, so that whilst "each piece of soft iron shall be attracted or drawn towards and "through the hollow central passage-way or chamber of a helical "magnetic coil or series of such helical magnetic coils in turn, a

"direct action in a straight line through such coils is converted "into a continuous rotary motion, when the helices are connected "with the battery and a current of electricity is caused to circu- "late through the properly insulated wires forming the coils, and "the action may be regulated by any of the well known means "for making and breaking contact."

"Instead of arranging the magnets around the circumference "of a revolving frame or disc, or in any of the ordinary modes or "methods heretofore employed, I form a jointed belt or chain, or "a series of pieces of any suitable shape, connected or hinged "together, as as to form an endless band or belt composed of "alternate conducting and non-conducting materials, or materials "subject to the action of electro-magnetism, alternated with "those not subject to such influence whilst passing through the "helices, and I mount or support such a chain or series of mate- "rials so disposed upon two drums, or the peripheries of suitably "mounted wheels, or their equivalents, and these drums or wheels "are caused to rotate by the alternate attraction of the iron links "or portions of the chain, motion being communicated from one "or both these drums by means of toothed gearing, or in any "other convenient manner."

[Printed, 4d. No Drawings.]

A.D. 1862, February 22.—N° 469.

CHAVASSE, Horace, MORRIS, Timothy, and HAINES, George Battison.—"An improvement or improvements in "the manufacture and ornamentation of metallic bedsteads, part "of which is also applicable to other articles."

The surfaces of the said articles are prepared to receive an electro-deposit of "brass, bronze, German silver, or metal or other "metallic alloy," by one or more of the following processes:—

1st. The iron articles are drawn through draw plates, dipped in molten tin, or other molten soft metal, and again drawn through draw plates or burnished.

2nd. Iron may be coated with zinc ornaments or with sheet zinc. In this way drawn tubes may be prepared. Zinc itself may be used instead of iron coated with zinc, and prepared for the electro-depositing process by being drawn through draw plates or burnished.

3rd. Stamped, spun, or drawn zinc or sheet tin may be used to

manufacture ornamental designs, to be afterwards electro-coated with brass, &c.

The cavities or hollow spaces of the ornaments may be filled up "with gypsum, cement, or a mixture of gypsum, cement or lime, "or any cheap and light substance as sawdust, either alone or "mixed with cement, glue, size, resin, or pitch."

"If it is intended to join two or more pieces of iron together to "form a portion of a bedstead," a brass mould is used, which admits "of the rods or pieces of iron intended to be joined together being placed in their proper position within such mould." The mould should be used in a heated state.

The electro-deposited metal or alloy is finished "by burnishing "or polishing and lacquering in the ordinary manner."

[Printed, 4d. No Drawings.]

A.D. 1862, February 25.—N° 514.

COOK, Harry Whiteside.—"An improved mode of and "apparatus for propelling carriages and vehicles by means of "electricity."

Use is made of the force which an electro-dynamic helix exerts upon its core or "bar," "to bring the centre of the coil to a position identical with that of the centre of the bar." A flexible stationary core, composed of alternate lengths of magnetic and non-magnetic material, is secured at both ends, and extends along the entire length of the railway on which the carriage to be propelled is intended to run. The said carriage carries a galvanic battery; two electro-dynamic helices, having the flexible core suitably guided through their tubular axes; a commutator; a "contact breaker," and a starting apparatus. The ordinary mechanical action of the wheelwork of the starting apparatus upon certain holes in the core, brings the helices into the proper position for acting most suitably upon the core, and when the "contact breaker" is made to complete the electric circuit, the carriage moves on until it is within the range of action of another magnetic portion of the core; the electric circuit is completed and interrupted at suitable times by means of the commutator, which is worked by a lever and click arrangement connected to a wheel rotated by the above-mentioned holes in the core; the electric contacts with the two coils being made in proper sequence, and at proper times, it is evident that the carriage will continue to run as

long as required. In order to reverse the direction of the motion of the carriage, a "reversing plate," in the "contact breaker," is made to suitably alter the passage of the electric currents.

[Printed, 10*d*. Drawing.]

A.D. 1862, March 1.—N° 562.

RAGON, ADOLPHE ERNEST (*a communication from Pierre Jules Emile Vinay*).—"Improvements in electric alarums for telegraphic "purposes."

In this invention, the residuary magnetism is carried off from electric alarums by means of certain arrangements of "differential "wires," in combination with the line battery and station battery, the circuits of which are completed by suitable mechanical means at the proper times.

The apparatus consists of a line-circuit electro-dynamic coil, and a station-circuit electro-dynamic coil. The armature of the line-circuit coil is hinged to the core of the station-circuit coil, and, when the line circuit is completed, the said armature completes the station circuit; the electric current through the station-circuit coil then actuates the bell hammer, passing through the core of each coil, and through the wire of its own coil "into the ground, "thus carrying off effectually the residuary magnetism." The hammer continues to strike the bell "so long as the communi-"cation with the station battery is preserved."

The armature of the station-circuit coil is connected by a spring to the core of the line-circuit coil, and forms the lower part of the bell hammer. The electric circuit through the station-circuit coil is only fully completed when its armature is not attracted, and this part of the apparatus is therefore self-acting.

By this invention "the maximum effect of the 'line battery'" is obtained.

[Printed, 10*d*. Drawing.]

A.D. 1862, March 4.—N° 594.

GUY, GEORGE FULLER.—"Improvements in electro-magnetic "motive-power engines."

This invention "consists in the employment of one or more "series of electro-magnets, arranged in circles, and made to act "successively upon a ring of soft iron, which is made to roll over "them. This ring is connected to the main shaft of the machine

"by any convenient and simple arrangement of universal joint "which will permit of it gyrating in all directions round the "shaft, whilst it is at the same time coupled thereto, so as to be "incapable of rotating without carrying the shaft round with it. "As the circumference of this ring is larger than the path of the "magnets over which it rolls or gyrates, in proportion to the "greater or less angle at which it works, it follows that at each "gyration, it will make a slight advance in a rotatory direction, "such advance being imparted to the main shaft of the machine. "Any convenient commutator may be employed for directing the "currents into the several magnets in the proper order and suc-"cession as required, a continuous rotatory motion being thus "obtained."

In the Drawings, the annular wrought-iron armature is placed between two circles of electro-magnets.

The wheel commutator employed is rotated by means of an arrangement of arms and cranks connected with the armature; it consists of insulated semicircles, each in connection with one battery pole, which pass successively over certain insulated rollers in connection with the coils of the electro-magnets, one roller being part of the circuit to a particular coil. Half the circle of electro-magnets is magnetized at one time.

[Printed, 1s. 2d. Drawings.]

A.D. 1862, March 8.—N° 633.

GISBORNE, FREDERIC NEWTON, and WICKENS, HENRY.—(*Provisional Protection only.*) "Improvements in the means of "indicating the presence of fire-damp or choke-damp in mines, "and of dispersing fire-damp, and also of telegraphing in mines."

The fire-damp, or carburetted hydrogen gas, is lighter than the air, and the choke-damp, or carbonic acid gas, is heavier than the air, and this invention consists "in the employment in combination "with suitable apparatus of those relatively lesser or greater "weights to connect an electric circuit, and thereby cause the "required indications or signals to be given."

In one instance the metallic circuit is completed by means of a balanced lever and contact pieces placed in a vessel, the mouth of which is closed by means of a double layer of India-rubber strained over a ring; the like results may be obtained by "the pressure of "the gases on a vacuum chamber," "and in a similar way by a "metallic barometer."

The signals given may either be the illumination of a vacuum tube by means of a Ruhmkorff's coil and condenser in the indicating circuit, or the withdrawal of an opaque slide from the bull's eye of a Davy lamp, so as to expose the coloured light. The indication of these signals may be either in the mine or at the pit's mouth. Danger may likewise be indicated by sounding an electro-magnetic alarum, or igniting an explosive compound at the surface.

"The fire-damp may be dispersed by firing it as it is generated "by means of the pressure contact completing the circuit and "igniting some explosive compound."

[Printed, 4d. No Drawings.]

A.D. 1862, March 11.—N° 661.

SMITH, Richard.—(*Provisional Protection only.*) "Improve-"ments in telegraph posts."

"This invention relates to improved modes of forming and "combining a number of short lengths to form each telegraph "post. The top length is of wood, and the bottom length "entered into the ground is tubular and usually of cast iron, "whilst the intermediate lengths are tubular and usually of thin "malleable iron. The separate lengths are made slightly tapering, "and so that the top of one may fit inside of the next above it like "a spigot and faucet. The lowest malleable iron length is fixed "upon the cast-iron bottom length by means of pinching screws, "which are entered through an external ring. The spigot or "small end of each malleable iron length is by this invention "formed with an indentation or corrugation running round it to "give it sufficient strength to sustain the portion of the post "above it; or for the same purpose the extreme end of the "spigot may be flanged inwards; or again, both corrugation and "flange may be combined, or there may be two or more corru-"gations.

"According to another modification the requisite strength at "the joint is obtained by inserting one or more discs, either "plain or flanged, and such discs may be introduced at various "parts of the tubular lengths to give increased strength to the "post.

"According to a further modification the tubular lengths are "butt-jointed, an external short tube or ring being applied to

" connect the two parts together, whilst a solid plug of wood or " other material is fitted tightly inside to prevent crushing or " collapsing."

[Printed, 4*d*. No Drawings.]

A.D. 1862, March 12.—N° 665.

RUSSELL, Alexander James (*a communication from Francis Bensa and Windham Charles James Anstruther*).—(*Provisional Protection only*.) The title of this invention is " Improvements in the " arrangement of the electric conductors for submarine tele-" graphs."

" This invention consists in twisting, coiling, or winding the " conducting wires for submarine telegraphs around the cable " or core, that is, giving them the form and direction of helical " or spiral wires, instead of straight longitudinal wires, as here-" tofore adopted, and I now use from one to eight or more such " twisted or coiled wires or conductors, the insulation of each " being ensured by a covering of silk, and over this I now prefer " to use a covering or insulator of gutta percha or india-rubber, " and over this again a covering of hemp that has been steeped " in tar, grease, and such like substances, and over all the " external sheath, composed of small cords of hemp, or of hemp " and fine steel wire that has been steeped in grease, tar, and such " like substances. By these means the electric conductors will " become yielding, and adapted to the cable, and have many " advantages over the conductors inserted according to the old " arrangement."

[Printed, 4*d*. No Drawings.]

A.D. 1862, March 13.—N° 688.

HOWARD, John, and BULLOUGH, John.—(*Provisional Protection only*.) " Improvements in warping and beaming " machines."

This invention relates to " a self-acting stopping motion (that " is to say), a means of stopping the warping or beaming machine " when one or more of the warp threads break, by means of a " current of electricity. The electric spark or current acts upon " a magnet which is in connection with a catch or knocker-off " piece. Each thread of the warp supports a pin, which, when

"so supported, can only touch one of two conducting surfaces "connected respectively by wires to the negative and positive "poles of the battery. The moment a thread breaks its pin falls "on the other conducting surface, and thus forms a connecting "link betwixt the two poles. The electric current thus estab-"lished charges a magnet, which by attracting a catch or other "suitable agent brings the knocking-off piece into action. The "thread being pieced again, supports its pin above one of the "conducting surfaces, thereby breaking the connection betwixt "the two poles, so that the magnet having lost its power cannot "attract the agent which brings the knocker-off into action, and "so the machine continues working till another thread breaks "and allows a pin to fall, which acts in the manner above "described, and stops the machine."

[Printed, 4*d*. No Drawings.]

A.D. 1862, March 14.—N° 708.

PATERSON, Alexander John.—"Improvements in the con-"struction of electric telegraph cables."

"The object of this invention is the better to protect the con-"ducting wires in submarine and subterranean telegraph cables "from strain and many other injuries to which they are liable in "the various stages they have to go through till finally laid."

This invention consists "in the employment of a flexible or "jointed pipe or tube or series of tubes within which the insu-"lated conducting wires are placed. The pipes or tubes possess "great tensile strength, and may be made water-tight by gutta-"percha, india-rubber, tarred hemp, or any suitable material or "combination of materials with or without wire as circumstances "may require. This flexible jointed tubing may be protected "from corrosion when made of metal by galvanizing, or by being "coated or covered with gutta percha, marine glue, or any other "like protecting agents."

The Drawings show ferrules or short lengths of tubing united by strips secured by rivets to the ferrules.

"The flexible tubes may be made on the insulated conducting "wires, or the tube may be formed in lengths, and may have the "insulated wires inserted therein. The flexible tube may be "covered by a tube of gutta percha."

[Printed, 6*d*. Drawing.]

A.D. 1862, March 18.—N° 745.

MENNONS, Marc Antoine François (*a communication from Augustin Durand*).—" A new or improved means of arresting " headstrong or run-away horses."

This invention consists " in the utilization of the shocks pro- " duced by certain descriptions of magneto-electric and electro- " magnetic apparatus, as a means of checking the course of " headstrong or run-away horses. To this end a pair of flexible " conductors formed of single or tressed copper or silver wire are " inserted in the reins of the bridle, the forward extremities being " each connected with a piece of moistened spunge so attached to " the musrol or cheek bands as to press, when in position, against " each side of the horse's head, at a short distance below the eye. " The opposite extremities of these conductors, prolonged beyond " the grasp of the reins, are fitted with rings or other suitable " metallic attachment, so arranged as to be readily connected " with the poles of an induction coil set within reach of the rider " or driver, as the case may be."

" A modification of the arrangement known as 'Breton's electro- " 'medical coil' having its rotatory mechanism so condensed as " to admit of insertion in an ordinary saddle frame, has been " found to answer every purpose."

" When the horse refuses to obey the rein, or otherwise shews " an inclination to run away, it is simply necessary to set the coil " in action by one or two revolutions of the hand bar," " so as to " pass a succession of feeble shocks through the portion of the " head comprised between the sponges." " The effect of this ap- " plication is to subdue the animal almost instantaneously, and " to bring it to a stand still within a few seconds, even when " running at full speed."

[Printed, 8*d*. Drawing.]

A.D. 1862, March 18.—N° 749.

BANKS, James.—" Improvements in electro-magnetic telegraph " printing apparatus or marking instruments, and the instru- " ments or apparatus to be used in connection therewith."

Electro-magnetic force is used to record the telegraphic message and clockwork is employed to draw forward the strip of paper. The general principle of the communicating and recording

apparatus to which this invention relates is that of the Morse marking apparatus; the recording instrument, in this case, however, acts, by means of a "striker" (which is a prolongation of the armature), direct upon the travelling strip of paper, instead of through a lever as in the Morse machine.

The printing electro-magnet has projecting polar terminations at a little distance from the flange of the coil, so that the armature may be placed between the said terminations and the flange. The armature consists of a circular disc, free to revolve upon an axis parallel to the axes of the coils, and capable of moving towards the polar terminations. The paper guide and inking roller are mounted upon the projecting polar terminations, a little on one side of the centre of the apparatus. When the electro-magnet is excited, the armature is attracted to the under side of the polar terminations, and carries the striker aginst the paper so as to force it against the inking roller.

Either an inking roller, solid ink marker, or marking band may be used in combination "with the direct-acting striker."

The armature axis, being eccentric to the paper band, is revolved thereby, so that the magnetization of the armature is prevented.

This invention also includes "the adaptation of the direct-acting " and freely revolving armature for the purposes of 'relay' and " 'transmission.'"

[Printed, 1s. 2d. Drawings.]

A.D. 1862, March 20.—N° 776.

ROBERTS, Robert Martin.—(*Provisional Protection only.*)

"Improvements in obtaining and applying motive power."

"This invention consists in using for obtaining and applying " motive power or force a weighted wheel, the weight being placed " at a given point of the circumference thereof (or only a projecting lever or radius weighted at its end) such wheel (or " lever or radius) having affixed to the axis or shaft thereof and " turning therewith an eccentric so set on the aforesaid axis or " shaft that the rim of such eccentric shall always be nearest to " the weight on the wheel (or lever or radius aforesaid). This " eccentric to be arranged so as to continuously work into an " eccentric opposite thereto, fixed in the like manner as aforesaid " on the axis of another and similar weighted wheel (or lever or " radius). The two wheels and eccentrics so arranged as afore-

"said cause the weights to traverse a portion of the circle (the "one weight pulling opposite to the other), and in order to "traverse the other part of the circle two, four, or more precisely "similar weighted wheels (or levers or radii) and eccentrics work-"ing in conjunction as aforesaid are connected (by wheel gearing "for instance) with the aforesaid arrangement of weighted wheels "or levers or radii and eccentrics. The weights on the wheels "are to be so placed and the eccentrics so arranged with regard "to each other that whilst (upon the first impetus being given "by moving one of the wheels) one weight will carry on rotation "through one arc of the circle, another weight shall carry on "through another until the entire circle of rotation shall be "effected, when another circle of rotation will begin, and so on. "From one of the axles power may be applied to any purpose "required. Instead of weights applied to the circumference of "the weighted wheel, *electric or magnetic force* might be applied "to the wheel."

[Printed, 4*d*. No Drawings.]

A.D. 1862, March 27.—N° 843.

HAWORTH, John.—"An improved method of conveying elec-"tric signals and telegrams without the intervention of any "continuous artificial conductor."

In communicating between two stations, the inventor uses the following apparatus at each station:—A galvanic battery, a secondary electro-dynamic coil apparatus, a needle indicating instrument, a "condenser" with plates and primary and secondary coils of gold leaf and gold wire respectively, a zinc box containing a coil insulated therefrom, and various earth plates. The galvanic battery is connected to the electro-dynamic coil apparatus, to the signal instrument, and to the condenser, these connections being made in a peculiar way; the condenser is connected to certain earth plates (of zinc and copper respectively) in the immediate neighbourhood of the zinc box, which is also buried in the earth; the primary and secondary coils of the condenser are connected together, and the outer extremity of the primary coil is connected with the coil in the zinc box. The zinc box and its earth plates at one station are placed opposite to certain sets of copper and zinc plates at the other station; the said sets of plates are connected to each end of the primary coil of the electro-dynamic coil apparatus.

The inventor supposes that the course of the electric current from the transmitting station is from the galvanic battery to the electro-dynamic coil apparatus, thence through the home signal instrument to the condenser, and from the condenser coils to the coil in the zinc box, thence through the earth, the electro-dynamic coil at the receiving station, the receiving signal instrument, the condenser, the return earth plates, and the earth, to the return earth plates at the transmitting station.

The condenser is described in the Provisional Specification as having only a primary coil.

[Printed, 1s. 2d. Drawings.]

A.D. 1862, April 8.—N° 997.

BREAREY, FREDERICK WILLIAM.—" Improvements in medi-" cated cups or vessels for drinking purposes."

1st. " The improved medicated steel bitter cup."

2nd. " The improved medicated mineral cup."

3rd. " The improved medicated galvanic cup."

A glass cup has three "water-tight cells or compartments " therein separated one from the other." " The internal surfaces " of the central compartment I line with metal or mineral on one " part and with wood or vegetable." " Extending across this " compartment, and forming a metallic connection between the " two side cells, I fix a bar or perforated plate of metal. When " using this galvanic cup, the water or other liquid is first placed " in the centre compartment, where it is medicated; then by " filling the side compartments, one with granulated copper and " fine sand and the other with granulated zinc and fine sand, and " adding to each a little acidulated liquid, the galvanic essence " will pass or flow along and over the metal bar or perforated " conductor through the medicated water or liquid, and will " impart its medicinal virtues to the same, and thus a combined " medicated and galvanized action will be obtained."

According to another method the inventor makes the cup in two or more parts, and fixes therein a voltaic pile, and galvanizes and medicates "the water or other liquid placed therein by " slightly acidulating the same."

The Provisional Specification states that the "galvanic cup" consists of a cup or vessel made of alternate rings of zinc and copper, "so that upon placing in the vessel slightly acidulated

"water," "a galvanic action is produced," and the water "in the "vessel becomes chemically affected in a corresponding degree."

[Printed, 4d. No Drawings.]

A.D. 1862, April 10.—N° 1021.

FRYER, DANIEL, and WILLIAMS, WILLIAM JAMES.—(*Provisional Protection only.*) "Improvements in the method of and "apparatus for letting on and cutting off the supply of gas to "groups or districts of street and other lamps from a central "point or depôt."

In this invention the inventors "prefer the arrangement of "lighting by means of an electric spark passed along a wire to "each lamp."

This plan consists "in applying to the ordinary branch gas "tube which supplies each lamp, a flexible air-tight junction of "india-rubber." "On each side of the tube may be placed two "small plates to act as nippers, so that if they be compressed "by any force they will nip the flexible tube and close the pas"sage, we now enclose this flexible portion in an air-tight "flexible chamber formed of materials capable of allowing it to "collapse and expand without fracture when the air is withdrawn "or forced into it. With this arrangement it will be seen, that "if the air by any means be extracted from the air-tight flexible "chamber, it will collapse, and the external pressure will cause "the nippers to grasp the flexible tube, and close its passage, and "cut off the supply of any gas passing through to the lamp, and "upon the equilibrium being restored by the admission of air, "the current of gas will be let on, the nippers relaxing their grasp "from this relaxed pressure. If, on the other hand, the air be "forced into the chamber, the increased pressure will act in a "similar manner."

[Printed, 4d. No Drawings.]

A.D. 1862, April 14.—N° 1065.

TOLHAUSEN, FREDERICK (*a communication from Jean Baptiste Rousse and Henry Vivés*). "A telegraphic dial printing appa"ratus."

The type wheel is driven by clockwork, and its rotation is governed by an escape wheel on an axis in gear with the type-wheel axis. The line-wire electro-magnet liberates the escape

wheel, whenever a line current is sent, so as to rotate the type wheel the space of one letter. The printing electro-magnet is excited, by means of a local battery, "at the beginning of each " telegraphic communication," but is inactive during the rotation of the type wheel until the "anchor" of the line-wire electro-magnet is at rest, it then attracts its armature, thus printing off the letter "which has been brought to the lowest point of the " type wheel;" the paper is drawn along by the action of a pawl (placed on the armature of the printing electro-magnet) upon a ratchet wheel fixed on one of the drawing rollers.

The hand of a dial is also driven by the clockwork apparatus, and its motions correspond to those of the type wheel.

The "Bréguet" manipulator can be used with the above-described printing apparatus. To insure correctness and speed of transmission, it is preferred to use, in connection with the "Breguet" manipulator, a clockwork arrangement and a circular key board. The pressure of a finger key stops the rotation of an arm and enables a given letter to be printed at the receiving station. "The speed of the revolving notched disc" is regulated by an escape wheel "which works into an oscillating anchor" " connected with a pendulum swinging between two pins, which " can be set nearer to or further from each other by means of a set " screw."

[Printed, 8*d*. Drawing.]

A.D. 1862, April 14.—N° 1068.

DARLINGTON, JOHN.—(*Provisional Protection only.*) This invention is entitled "Improvements in the arrangement of marine " telegraph wires and cables."

The inventor states:—"Instead of laying telegraphic wires or " cables so as to rest on the bed of the sea, I propose to arrange " these in such a manner as to lie only a portion of their length " on the bottom, and in deep water to suspend them by means of " floating or partially submerged buoys, set at such distances as " may be found necessary; also at certain distances to stay or " anchor such wires or cables by means of suitable appliances. " I further propose to connect with such wires or cables wherever " it may be found desirable, floating telegraphic stations for the " receipt and transmission of messages."

[Printed, 4*d*. No Drawings.]

A.D. 1862, April 16.—N° 1095.

GISBORNE, FREDERIC NEWTON.—(*Provisional Protection only.*) The title of this invention is "Improvements in the construction "of electric targets for rifle and gun practice."

The inventor states:—"In lieu of the chemical decomposition "recorder described in my Patent of the sixteenth day of May, "one thousand eight hundred and sixty-one, No. 1246, I some- "times use a series of electro-magnets for the purpose of printing "or puncturing the paper diagram, and in order to do so effec- "tually I charge the style points with ink almost simultaneously, "and by another arrangement I cause the paper to change its "position over the said styles and thereby record correctly several "shots on the same segment. I also use a disc attached to my "target, hammers, or balls, which moves excentrically when in "motion and thereby imparts a rubbing electric contact to a "spring suitably placed near it. I also combine permanent and "electro-magnets to arrest and release at pleasure the balls or "hammers when they recoil. I also impart motion to a slide or "shutter in front or the diagram, by attaching thereto an iron "axis, so placed that when pivoted excentrically it will fly up or "back according to the position of the said axis to an electro- "magnet. I also employ the alternate action of electro-magnets "between the target and firing stand, which in effect are almost "synchronous, and in accordance with the meaning of those "described in the Specification of my said Patent."

[Printed, 4d. No Drawing.]

A.D. 1862, April 16.—N° 1097.

BARBOUR, JOHN (*a communication from William Thomson*). —"Improvements applicable to upholsterers' and other hand "hammers."

"This invention consists in magnetising or applying magnetism "in connection with hammers, that tacks or other nails may "be picked up by them and driven into the wood or other "substance.

"These improved hammers it is preferred to construct with T- "heads, and the attraction end formed with a small face, and "surrounded with a collar of gutta percha or other suitable non- "conducting substance to prevent the tacks or nails adhering

" otherwise than to the magnetised face of the hammer, which is
" presented to the head of the tack or nail to be picked up, that
" the point may be presented to and inserted into the material
" into which it is to be driven with great facility, when it can be
" driven home by the reverse end of the hammer. The whole of
" the hammer head, except the two faces, is coated or covered with
" a suitable non-conducting material. It is also preferred to fit
" the bottom of the hammer helve with a pair of claws for the con-
" venience of taking out tacks or nails. The hammer heads may
" be magnetised by any of the ordinary methods now used to
" magnetise the needles of mariners' compasses, as is well under-
" stood, or in any other convenient way."

[Printed, 8d. Drawing.]

A.D. 1862, April 19.—N° 1149.

PARKES, Alexander. — "Improvements in surface con-
" densers."

" Surface condensers are now commonly made with copper or
" brass tubes, and it is found in practice that these metals become
" more or less acted on when at work by the steam and grease,
" and consequently when the condensed or condensation water is
" used to feed the boiler, small quantities of salts of copper are
" introduced by it into the boiler; this causes corrosion to take
" place within the boiler, and not unfrequently considerable dam-
" age results." " Now my invention consists in coating the tubes
" with silver by means of an electro-plating process; the tubes
" may with advantage be silvered both inside and out, the princi-
" pal advantage is however, I consider, obtained by silvering the
" surface with which the steam comes in contact." " If ferrules
" are employed in fixing the tubes, as they usually are, the ferrules
" also should be electro-plated. Or, in place of employing tubes
" prepared in this manner, tubes prepared from sheet copper, or
" brass plated in the ordinary manner and bent up and soldered,
" may be employed, but I much prefer solid drawn tubes electro-
" plated."

[Printed, 4d. No Drawings.]

A.D. 1862, April 21.—N° 1153.

MONCKTON, Edward Henry Cradock.—" Improvements
" in the preparation of metal to be used in the construction of

"cannon, rifles, armour plates, and other objects used in naval or "military warfare or otherwise."

The Provisional Specification sets forth that this invention consists in binding together "masses of iron, copper or other "metal," and filling up the interstices "by means of electrical "deposition."

The Final Specification includes the following points:—

The purification of iron sand by means of magnets.

The employment of electricity in the preparation of steel. The pieces of metal "are laid over each other, and connected by "proper conductors of iron, with charcoal in powder two inches "thick or more laid between each."

The reduction of fused iron sand to a metallic state "with or "without the use of fluxes and of electricity."

The use of electrical deposition to unite together pieces of metal or wire.

The use of electro-brassing to protect iron from oxidation.

The use of intense electricity in connection with suitable conductors prepared as above, for the purposes of protection and defence in war and on board ship.

The use of steel, prepared as above, "in the formation of electric "shell," which are "filled with condensers of electricity, the shot "as it passes from the mouth of the cannon touches wires from "a powerful battery, and conveys the electricity through the air, "till it strikes, when contact takes place and the discharge is "effected with the same terrible effect as a discharge of lightning."

[Printed, 6d. No Drawings.]

A.D. 1862, April 25.—N° 1207.

BARNETT, Frederic.—(*Provisional Protection only.*) "Improved electric danger signals for railways, and other cognate "purposes."

The inventor proposes "that between all stations on railways "there shall be on each side of the line (for the up and down "trains), tall posts," "erected, surmounted by round balls," "or "other shaped signals to works in grooves, and be sustained in "their places each by a catch connected with a galvanic pile or "battery. The communication between the said pile or battery, "and the moveable ball or other shaped signal, shall be at the "station on either side of the said post or posts, supporting each

"a moveable ball or other suitable signal of whatever shape, by "means of which connection, the person at the station or else- "where in charge will be able by completing the circuit of elec- "tricity to cause these moveable signals to fall at the distance of "many miles from the upper to the lower part" "of the groove "on the signal post. Thus during the day giving abundant "notice to drivers to arrive cautiously, and avoid collisions."

"For night signals I propose that the same or other similar "tall signal posts shall be surmounted by electric lamps," "having the half only clear facing the arriving train, the other "half dark to avoid misleading trains coming in an opposite "direction. The light side will be constructed of glass of the "desired color with a reflector behind. The power of lighting "the said lamps will be in the hands of the manager of same "signals at the stations between which they will be situated."

"Common lamps may also be adapted with screens to blind the "light, the same screens to be let fall by electricity."

[Printed, 6d. Drawing.]

A.D. 1862, April 29.—N° 1255.

CLIFF, John.—(*Provisional Protection only.*) "Improvements "in insulators for supporting telegraph wires."

"My invention consists in constructing what I term a compound "insulator, as hereafter described.

"The compound insulator consists of two parts; the outer part "is formed with a notch in the top for the reception of the tele- "graph wire; the other part consists of a shaft, carrying near the "bottom thereof a disc, the diameter of which is nearly equal to "that of the inside of the mouth of the outer part; the bottom of "the shaft has a hole formed in it for the reception of the pin or "stud, by which it is connected to a post or other support; the "head of the shaft is intended to be lodged in a recess formed in "the inner and lower part of the body of the outer part, in order "that the two parts may be united to form the compound insu- "lator by means of a sulphur or other suitable insulating cement. "Care must be taken that the shaft and upper part shall in no "part be in contact, therefore the size of the recess must be large "compared with the size of the head of the shaft. In order to "prevent wet or moisture injuriously affecting the insulator, I "apply a coating of shell lac into the upper angle or head inside

" the outer part. The recess into which the head of the shaft is " inserted is enlarged at the bottom, and for further security " against damp or wet affecting the insulator, the inner surface of " this bottom part may be coated with shell lac, or the space " between it and the spindle may be filled with that material."

[Printed, 4d. No Drawings.]

A.D. 1862, April 30.—N° 1268.

DAVIES, George (*a communication from François Ferdinand Auguste Achard*).—" An improved electric apparatus applicable to " various useful purposes."

1st. The employment of the said electric apparatus as an automatic regulator. A "two-armed click" acts upon a ratchet wheel of a peculiar construction in two ways, so as to cause it to turn in two different directions, according to whether the electric current traverses the coils of a certain electro-magnet or not. In feeding steam boilers to a constant level, the circulation or interruption of the electric current is caused by the rising or falling of the float; the above-mentioned ratchet wheel, according to the direction of its motion, opens or shuts the feed cock, and thus maintains the water at a constant level; the breaking of the electric circuit opens the feed cock, and sounds an alarum, " when the level rises or " falls beyond certain limits," by means of additional electric contact pieces. Similar arrangements are used when the electric automatic regulator is applied to a manometer, thermometer, or hygrometer.

2nd. " The application of the electric apparatus or gearing to " railway purposes." The interruption of the electric circuit causes the force developed by the rotation of the wheels of railway carriages to be utilized to put the brakes into action; a click lever is then free to act upon the brake gearing, so as to apply the brake blocks; the unlocking of the wheels is performed by hand. In another electric-brake apparatus, the chain to the brake gearing is made to unwind itself when the electric current is broken. Whenever the above-mentioned click lever is free to act, it puts the bell hammer of an alarum into action until the re-establishment of the electric circuit.

[Printed, 1s. Drawing.]

A.D. 1862, May 2.—N° 1300.

WHITWORTH, Charles Frederick.—"Improvements in "apparatuses for signalling upon railways."

To signalize by bell, its electric circuit is completed by the depression of a "loose rail" or arm by the flange of the engine wheel in passing. To produce this effect certain levers, rods, and counterbalance weights are employed; the long arm of the weighted lever which receives the direct action of the "loose "rail" is "connected to the loose limb of a bellows, to prevent "the two" [too?] "rapid return of the loose rail."

When the arms or lamps of a signal post are also worked by this apparatus, certain other levers, chains, and pulleys enable the motion of the "loose rail" to revolve the signal arms and to operate the red glass. To restore the signal to "all clear," after the above-mentioned action of the engine wheel upon it, the armature of an electro-magnet acts upon a short arm, so as to pull over the "weighted arm" of a "releasing spindle" and cause "the signal to revolve to 'all right;'" a long "curved arm" on the axis of the signal arm replaces the "weighted arm" of the "releasing spindle;" an eccentric on the signal-arm axis breaks the electric circuit when the signal arms return to "all "clear." To reset the signal to "danger" from the station, another electro-magnet "releasing spindle" and other parts, similar to those explained above, are employed.

By suitable arrangements of the circuit wires with the above-described apparatus, the "operations of indicating the approach "of trains when yet at a distance setting the distant signal to "'all clear' and ascertaining whether the signal be 'on' or not "at any time and for setting the signal to 'danger,'" may be perfectly accomplished.

[Printed, 1*s*. 6*d*. Drawings.]

A.D. 1862, May 2.—N° 1304.

NEWTON, Alfred Vincent (*a communication from Robert Cornelius*).—"Improved electrical apparatus applicable to the "lighting of gas."

"The gas burner to be lighted is fitted with an electric con-"ductor, consisting of a pointed wire, which is carried by a "bracket of vulcanite or hard rubber, or other good non con-

" ductor, and bent over the top of the burner. A chain leading
" from this wire is carried to some accessible point, and being
" touched by the electric apparatus will convey the electricity
" upwards, and cause the ignition of gas issuing from the
" burner."

" The apparatus forming the subject of the invention admits of
" various modifications in form and arrangement, but it may be
" described simply as consisting of a conducting and non-con-
" ducting surface, between which a highly electric substance,
" such as silk or lamb skin, is interposed, a slight friction there-
" fore set up between these surfaces will generate electricity
" sufficient to give off a spark."

An electrophorus consists of a hard rubber disc with a metallic handle and a metallic plate with a non-conducting handle; the metallic plate is covered with lamb skin, and the stem of the conducting handle slightly projects at the centre of the " hard rubber " disc," thus the metallic plate need not be touched by the hand.

Another modification of the invention consists in " a combina-
" tion of the Leyden jar with the electrophorus." The Leyden-jar arrangement is lined with lamb skin, and is furnished with a plug or cylinder of hard rubber.

[Printed, 1s. 4d. Drawings.]

A.D. 1862, May 9.—N° 1398.

BOLTON, FRANCIS JOHN.—" Improvements in telegraphing
" for naval and military and other purposes, and in the apparatus
" connected therewith."

An intensely powerful light is employed, " consisting either of
" the electric light, the lime light, or other light, which is to be
" alternately obscured or eclipsed and displayed so as to produce
" visible flashes of light of long or short duration, and in any
" desired order of succession so as to produce the required
" signals."

The shutters for obscuring the light " may be raised and
" lowered by causing electro-magnets to act on armatures con-
" nected with the shutters. These electro-magnets may be put
" in action from a distant station by causing a current of elec-
" tricity to pass through the coils of the electro-magnets in any
" of the well known manners for working electro-magnetic ap-
" paratus."

The Specification describes, and the Drawings show several arrangements for effecting the object of this invention by means of a lime light, but no further remarks are made respecting the use of the electric light for this purpose.

Optical means are used to concentrate the light upon the distant station.

"In conjunction with this apparatus for transmitting the "light, the signals are received in a darkened chamber, or other "convenient appliance through a lens or on a reflector, whereby "they are concentrated on a field, from which all unnecessary "rays of light are excluded."

[Printed, 2s. 4d. Drawings.]

A.D. 1862, May 10.—N° 1404.

MOORE, ROBERT.—"Improved apparatus for indicating the "presence, position, or accumulation of liquids, gases, or vapours, "and apparatus for preventing danger or damage consequent "thereon."

Certain "transmitting media" act upon "signalling contri-"vances." "Electric, electro-galvanic, or electro-magnetic cur-"rents" are amongst the "transmitting media" employed.

The following apparatus are set forth :—

1st. A fluid indicator consists of a float which acts on the "transmitting medium" by means of a lever.

2nd. "Barometric pressure" is used to act on the "transmit-"ting medium."

3rd. The rise of a conducting liquid acts upon two galvanic elements, and gives the required signal.

4th. The action of the atmosphere depresses the float of a hydrogen indicator, and thus completes the electric circuit.

5th. In a hydrogen indicator, the hydrogen is exploded in a Davy lamp by incandescent electrodes; the explosion signals.

6th. In a gas indicator, the rotation of a disc signals.

7th. An electro-magnet acts upon a gas tap, by means of a detent and weighted lever, when an escape of gas is indicated.

8th. The contact is made by the action of the gas upon a hollow surface, which is suspended to one arm of a balance.

9th. In a steam indicator, a weighted valve makes contact at several grades of pressure.

10th. In an ordinary indicator, the index hand makes contact at several pressure values with insulated studs.

To prolong the contact with the "transmitting medium," a bead of mercury passes from the ascending to the descending arm of the lever.

The use of a galvanic coating to platinum is mentioned, but not particularized, in the Final Specification.

[Printed, 10d. Drawing.]

A.D. 1862, May 16.—N° 1482.

LAMING, RICHARD.—"Improvements in constructing and "using electric telegraphs."

This invention relates to certain adjustments of the parts of the electric telegraph; to constructing and using submarine cables "with conductors immediately surrounded by insulators of dried "organic materials in a fibrous condition saturated with insulat- "ing cements;" to constructing and using the said cables "in "which the insulation and the tensile strength are conferred "either wholly or in part by dry organic materials used in a "fibrous condition;" also to "the application and use of tubes "of caoutchouc, and of lead, and of servings of vulcanized caout- "chouc," "for keeping dry insulators of subaqueous telegraph "cables composed of dried hemp and insulating cements."

The object of this invention is to carry out a certain view of electrical action, according to which it is proposed to supply the conducting wire with only that amount of electric force which can be passed out of it in the same ratio as it enters, *i.e.* passed along it by "true conduction" in contradistinction to "diffusive con- "duction;" by this arrangement the conductor is "never in pos- "session of more than its own natural quantity of electricity."

In this telegraph a battery is "permanently retained in the "line of conduction" at the receiving station, and there is a second battery at the sending station. The signals may be made "by alternately breaking and making contact between the con- "ductor and the battery at the sending station." Another method of making signals consists in "putting the end of the "conductor at the sending station into communication alter- "nately with the voltaic battery there placed and the earth."

The points relating to submarine cables are not set forth in the Provisional Specification.

[Printed, 6d. No Drawings.]

A.D. 1862, May 19.—N° 1515.

MORRIS, Timothy, WEARE, Robert, and MONCKTON, Edward Henry Cradock.—"Improvements in the means "and apparatus for the protection of life and property by the "agency of electricity."

This invention consists in the application of induction coils and constant batteries to the above-mentioned purposes. It is preferred to use the constant battery described in N° 2298 (A.D. 1861), and the induction coil set forth in N° 2661 (A.D. 1861).

The primary circuit of the above-mentioned coil is completed by moving a handle connected with the door or other means of entrance to the place to be protected, such movement bringing the said handle into contact with a spring or other terminal of the opposite pole of the said circuit.

The secondary circuit has the said handle for one of its poles; and a metallic plate fixed to the floor for the other pole. A person standing on the metallic plate, and attempting to turn the handle, completes the secondary circuit and is the recipient of an intense current of electricity.

An electric fire alarum is described in the Provisional Specification. An air chamber is connected with a tube containing mercury and the battery terminals. The elevation of temperature expands the air, and completes the electric circuit by forcing the mercury up its tube till it reaches the said battery terminals.

[Printed, 4d. No Drawings.]

A.D. 1862, May 19.—N° 1516.

MORRIS, Timothy, WEARE, Robert, and MONCKTON, Edward Henry Cradock.—"Improvements in obtaining and "applying light and heat by electricity."

The electricity from the induction coils described in N° 2661 (A.D. 1861), in connection with the inventors' "patented bat- "teries," is used to obtain light "by passing electricity through "vacuum tubes or other suitable vesssels;" heat is also obtained "with or without such induction coil by means of such bat- "teries."

The vacuum vessels used may either consist of two sheets of glass "hermetically sealed round the edges," or of two globes "placed one within the other." The vacuum used may be either a gas, vapour, or ether vacuum, or a combination of these. The

light is increased by electrically connecting the vacuum vessel with Leyden jars charged by means of induction coils and batteries; this electrical arrangement may be used without the vacuum vessel.

Light in railway carriages may be produced by means of magneto-electric machines attached to the wheels of the said carriages.

Reflectors, lenses, coloured glass, and covers may be used in connection with the light produced as set forth above. The reflectors may consist of metallic deposits on the back of the vacuum glasses.

Spirals of flattened platinum wire, carrying electric currents, furnish heat to liquids or other substances.

"For jewellery and other purposes, we propose to fuse together "by electricity the joints or ends of various metals, and also to "fuse those solders where it is necessary to use them whether "soft or hard."

Other details are set forth in the Provisional Specification.

[Printed, 4d. No Drawings.]

A.D. 1862, May 20.—N° 1528.

PETRIE, William.—The title of this invention is, "Improve-"ments in vessels for boiling chemical products, as sulphuric "acid, and in apparatus for indicating the degree of concentra-"tion and temperature of such products in the boiler, which "apparatus is applicable to other pyrometric purposes."

A portion of this invention involves the use of an electro-deposited metal.

The apparatus forming the subject of this invention consists of:—

1st. A boiler made "of a stiff and elastic alloy of platinum "with iridium."

2nd. A collecting vessel "to receive the overflow of the liquid, "and prevent its boiling up into the head of the boiler."

3rd. An "indicator," which also serves as a pyrometer.

That portion of the invention which involves the use of an electro-deposited metal is as follows:—"The surfaces of the boiler "which are to receive heat are made rough or 'dead' externally, "that is, not polished, and are blackened by attaching, pre-"ferably, finely divided platinum by electric deposition."

[Printed, 8d. Drawing.]

A.D. 1862, May 21.—N° 1532.

BURNETT, WILLIAM HICKLING.—(*Provisional Protection only.*) "Improvements in the mode of working telegraphic lines, and "in instruments and apparatus employed for telegraphic pur- "poses."

1st. Two telegraph lines are used in connection with coils wound in opposite directions round the instruments.

2nd. Two telegraph lines, through which an electric current is constantly kept flowing, are connected with the opposite poles of a battery at the sending station and with the receiving instrument at the receiving station. Signals are made by connecting either battery pole with the earth.

3rd. A battery at each of the two stations enables an electric current to flow constantly round the two lines. "The coils of "the instrument at the two stations are connected respectively "with earth at one end," "whilst the other end can be put in "connexion with either pole of the battery at the station."

4th. One line wire is used, either in connection with a battery at the receiving station and a coil at the sending station, or with a battery at each end of the line.

5th. Instead of having a battery of full intensity power at each station, the number of couples required to work the line are "spread," "as it were, all along the line." N° 1271 (A.D. 1860) is mentioned.

6th. To work "two or even three distinct systems of telegraph "through one line wire," "batteries of unequal force are used to "deliver the different messages." According to one plan the currents are caused to flow in different directions. In another plan an additional "local battery" and rheostat are used in connection with "batteries of different degrees of force and in "different directions."

7th. In "a compound receiving instrument" a single clockwork and paper strip are used in connection with the required number of markers and electro-magnets.

[Printed, 4d. No Drawings.]

A.D. 1862, May 21.—N° 1538.

NEWTON, WILLIAM EDWARD (*a communication from Charles Husson*).—(*Provisional Protection only.*) "Improvements in the "manufacture of metallic or mineralized fabrics or surfaces."

"This invention of improvements in the manufacture of metallic "or mineralized fabrics or surfaces consists in coating or covering "the surface of a textile, woven, or other fabric with a thin sheet "of metal, whereby the substance will be rendered waterproof, "and may be applied for a variety of useful purposes in the "arts.

"In carrying out the invention the foundation fabric, which "may be of woven cloth, felt, paper, or other suitable fabric, is to "be covered over or impregnated with a metallic composition or "preparation, such as plumbago, white or red lead, mixed with "any suitable adhesive material, or made into a bath, in which "the foundation substance may be dipped. The prepared material "may then be dipped in a metallic solution, (sulphate of copper, "for instance,) and by means of a galvanic or electric battery the "metal from the solution may be deposited upon the surface of "the foundation fabric."

[Printed, *4d.* No Drawings.]

A.D. 1862, May 22.—N° 1540.

SIEMENS, Charles William (*partly a communication from Dr. Werner Siemens*).—(*Letters Patent void for want of Final Specification.*) "Improvements in electric telegraph apparatus."

In N° 512 (A.D. 1859) certain types acted consecutively upon a contact lever, "so as to cause it to make and break contact with "the recording instrument, thereby producing signs exactly cor-"responding with the form of the types."

"In the present invention the arbitrary succession of signals "constituting a letter, number, or sign, is represented by a type "or by types, which is or are so formed that on being passed along "against a contact lever a series of currents are passed through "the line wire, which currents are produced by a magneto-electric "machine or other apparatus that produces a regular succession "of currents, the same being moved in such a manner by the "same mechanism which imparts motion to the types, that at the "moment when the type completes the line wire circuit a positive "or negative current, such as may be required, is produced and "transmitted through the line wire."

To carry out this invention, the "magneto-electric inductor" set forth in N° 2107 (A.D. 1856) has a screw thread formed on one end of its armature, "which is put in gear with a rack formed

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" on the under side of composing sticks, having grooves in " which the type is set up, which composing sticks are arranged to " slide in a groove, or between guides on top of the table." Another arrangement consists in fixing the type " upon endless " revolving bands or chains, or upon cylinders, having a rotary " motion imparted to them."

[Printed, 4d. No Drawings.]

A.D. 1862, May 22.—N° 1541.

PERRY, James Hillert.—" An improved method of curing " diseases of the human body by magnetism."

The apparatus (called " the magnetic equilibrist ") consists of a couch, easy chair, or other suitable frame fitted with a " magnetic " cap," arm rests " fitted with one or two galvanic batteries," magnetic belt, and " seat " and " foot " galvanic batteries.

In the " magnetic cap," permanent horseshoe magnets are arranged with keepers joining the neighbouring poles, so as to produce a metallic continuity in the series of magnets that are intended to be active.

The hand batteries are semi-cylindrical, and they are furnished with a metal heater.

The permanent horseshoe magnets in " the magnetic belt " are arranged in a similar manner to those in " the magnetic cap."

The batteries for the feet and seat are square, they are furnished with heaters.

" By means of the magnetic vestments and galvanic batteries a " permanent though insensible magnetic current is established " throughout the body from the head to the feet, without having " recourse to any additional conductor than the polarized magnets, " the galvanic batteries, and the vital principle of animal life. " Small batteries to be used without heat are also placed in the " soles of the shoes or boots."

[Printed, 8d. Drawing.]

A.D. 1862, May 22.—N° 1549.

BARLOW, George (*a communication from Thomas Shaw*).—(*Provisional Protection only.*) " A new or improved method of " laying submarine telegraphic cables."

This invention consists " in laying submarine telegraphic cables

" by partially supporting the said cables below the surface of the " water, during the paying out of the same, by means of friction " clutches or appliances supported from the ships' side as herein- " after explained.

" The friction clutches or appliances which it is preferred to use " consist essentially of three bow-shaped springs, the upper ends " of which are fixed to a ring. The free and lower end of each of " the said springs carries a block of metal, the said blocks being " pressed towards each other by the elasticity of the bow-shaped " springs. To the ring of the clutch a loop or eye is fixed, to " which loop one end of a rope or cable is fastened, the other end " being secured to the ship delivering the cable. By means of " the first-named rope or cable the clutch can be supported at the " required distance below the surface of the water. In paying out " the cable, it is passed through the space enclosed by the three " blocks, constituting the friction clutch, the said clutch pressing " upon the cable with some force. By using a series of the said " friction clutches the cable can be supported at different points, " by which arrangement the length or weight of cable between " two points of support can be rendered insufficient to bring the " conducting wires to a state of torsion. Although the friction " clutches or appliances described answer well in practice, yet " friction clutches or appliances of other constructions may be " employed with the same or nearly the same effect."

[Printed, 4*d*. No Drawings.]

A.D. 1862, May 22.—N° 1550.

COOK, Henry (*a communication from Professor Jean Minotto*). —" Improvements in electric batteries."

"The object of this invention is to construct galvanic or electric " batteries in such a manner that they may be continued in action " for several months without requiring any particular attention. " This object is effected by a modification of the Daniell's battery, " and the invention consist in using a layer or body of sand or " other suitable pulverized substance in place of the porous " vessels employed in the Daniell's battery. In carrying out the " invention the outer or receiving vessel is constructed of glass or " porcelain, gutta percha, or other suitable material, and upon the " bottom of this is placed a thin disc of copper, to which is " soldered an insulated copper wire, which is bent up and passes

"over the edge of the receiving or containing vessel. On this "copper plate is placed a quantity of sulphate of copper in crystals "or powder. When the sulphate of copper has been pressed "down a layer of sand is placed thereon, and on this a disc of "zinc, to which is soldered an insulated copper wire. It will only "be necessary to fill up the containing or receiving vessel with "water, and within an hour or two the battery will be in full "working order, and will continue so until all the sulphate of "copper is exhausted; this material must then be renewed, and if "found necessary the zinc disc must also be renewed, as these are "the parts which become exhausted."

[Printed, 6d. Drawing.]

A.D. 1862, May 23.—N° 1560.

MOULINE, Eugène.—"Improvements in apparatus used in "weaving."

The requisite to-and-fro motion is given to the shuttle by means of a permanent magnet.

The magnet is attached to a travelling carriage having wheels, "so that it can move to and fro from one end to the other" on a tramway or bar. The carriage is drawn by an endless chain "moved always in the same direction" by a pulley, "but giving "the carriage the necessary alternate movement." On the carriage there is a groove, having in it a bolt "which penetrates into "a link of the chain first above and then below, so that the "carriage shall be drawn first one way and then the other." The bolt is shifted alternately by springs placed at the two ends of the apparatus. "The carriage may be linked alternately to "the upper and lower part of the chain by any mechanical means "suitable for changing the direction of the carriage without concussion. The shuttle runs on a thin copper rod, held in a "frame capable of being raised or lowered as required, and the "magnet projects beyond the frame, so that it shall always be in "contact with the copper rod, and constantly maintain the "magnetic action."

The shuttle is made of iron, and carries two wheels on which the "diamond-shaped" poles of the magnet act.

[Printed, 8d. Drawing.]

A.D. 1862, May 27.—N° 1581.

TUCK, EDMUND. —(*Provisional Protection only.*) "Certain " improvements in electrical manipulation applicable to sub- " marine telegraphs."

" In place of the present method of completing circuit through " the sea (which has been found so destructive to telegraphic " submarine cables), I make use of the exterior iron wire covering " of the cable, to which I affix a covered conducting wire, which " is brought into contact with the interior conducting wire of the " cable by the instrument for receiving a message. In conveying " or delivering a message this contact is broken, and I make use " of a sheet or piece of zinc (in place of copper) in contact or " placed in the sea, to which is annexed a covered conducting " wire brought into contact with the copper or negative plate of " a voltaic battery, this is effected by the recording telegraph " instrument, as at present in use. When an electric cable is " damaged in its insulation and the copper conducting wire " exposed, to restore or renew communication I make use of a " cylinder or piece of zinc placed in contact with the sea, which " has annexed a covered conducting wire brought into contact " with an instrument for conveying or delivering a message; also " a piece of copper, which is so placed as to be opposed to the " zinc (as in a pair of voltaic plates). If a cylinder of zinc is " used the copper is placed within the cylinder with the ordi- " nary conducting liquid or sea water, as may be requisite. The " The piece of copper has annexed a covered conducting wire " brought into contact with part of the same instrument as the " as the piece or cylinder of zinc. In sending or delivering a " message, the wire attached to the zinc cylinder or plate is " brought into contact with the exterior iron wire covering of the " cable. The wire attached to the piece of copper is brought " into contact with the interior conducting wire of the cable; " this is effected by means of the recording telegraph instrument " fitted with a quantity coil, as at present in use."

[Printed, 4*d*. No Drawings.]

A.D. 1862, May 29.—N° 1620.

CLARK, WILLIAM (*a communication from Jean Henry Cazal*).— " An improved method of throwing the shuttles of looms."

"This invention relates to an improved method of throwing "the shuttle a given distance at a uniform and regular speed "by the application of the attractive force of the magnet or "electro-magnet as a motor; thus a shuttle is furnished with an "iron armature, acted on by a magnet or electro-magnet placed "in proximity to it, and having a suitable motion imparted to it "at a given speed, which will be thence transmitted to the "shuttle.

"The advantages of employing this improved method of "driving the shuttle are,—

"1st, prevention of all jerking and consequent rupture of the "threads.

"2ndly, counteraction of the dead weight of the shuttle, which "permits of its carrying an additional amount of thread.

"3rdly, the shuttle never stops at any point of its traverse.

"4thly, great saving of time by reason of its uniform motion, "uninterrupted by any rupture of the thread or stoppage of the "shuttle.

"5thly, the weaving may be effected with much more uni-"formity than formerly.

"6thly, the capability of weaving all kinds of fabrics."

"7thly, in this manner fabrics of great width may be woven, "thereby obviating the necessity of having joins or seams.

"The motion of the shuttle may be produced by the influence "of the electro-magnetism alone constituting the motive power, "or it may be obtained by the aid of a self-acting apparatus, and "thus form a self-acting shuttle."

[Printed, 4d. No Drawings.]

A.D. 1862, May 30.—N° 1631.

BURT, HENRY POTTER.—"Improvements in protecting wooden "posts from decay, more particularly applicable to posts for "supporting electric telegraph wires."

"My invention consists in protecting wooden posts or poles "that are fixed in the ground from decay by wholly or partially "surrounding the lower end of the same, which is sunk in the "ground, with one or more receptacles containing creosote, or "other preservative solution or composition, which becomes "gradually absorbed by the wooden pole or post, and preserves "it from decay, and which is renewed from time to time as it

"becomes absorbed. I prefer to construct the receptacle con-
"taining the preservative solution in the form of a socket, of
"wrought or cast iron, earthenware, or other suitable material,
"closed at the bottom, which surrounds the end of the post in
"such manner that a space or spaces intervene between it and
"the surface of the post, which space or spaces serves or serve to
"contain the preservative solution. In some cases, however, I
"do not completely surround the end of the post with the
"receptacle containing the preservative solution, but only a
"portion of the same, as the part of the post which is left exposed
"will be sufficiently protected by the preservative solution which
"it continually absorbs from the receptacle."

The Specification describes and the Drawings show posts with cylindrical sockets or receptacles, and with conical sockets or receptacles. The internal projections in the said sockets, to enable the posts to be surrounded with preservative solution, are in the form of flutings in one instance, corrugations in another, and screw threads in a third example.

[Printed, 6d. Drawing.]

A.D. 1862, May 31.—N° 1641.

MOREAU, Alexis, and RAGON, Adolphe Ernest.—"Improvements in electro-magnetic machines or apparatus."

"This invention consists in so combining and arranging the
"several parts of electro-galvanic machines as to be enabled to
"regulate with facility the intensity of the current, and further to
"keep up a continuous current, instead of giving it off by shocks,
"as at present practised."

The apparatus consists of a box, with a lid and hinged front, containing "an ordinary induction coil," having a bundle or core of loose iron wires, a carbon-zinc galvanic battery, and certain "handles," conductors, and accessory fittings.

The glass vessel of the single-fluid battery contains "a mixture "of dilute sulphuric acid and bichromate of potash or other salt." A rod, passing through the "stopper," or cover of the glass vessel, and fixed to the zinc plate, is capable of raising and lowering the zinc plate "between two plates of charcoal fixed to the stopper of "said vessel, contact of said plates and piece of zinc being pre- "vented by passing india-rubber bands around the zinc plate."

"The intensity" of the "continuous steady current" "may

" be regulated, as desired, either by raising or lowering the zinc " plate in the vessel," " or by increasing or diminishing the " bundle of wires placed in the induction coil."

" The person to be operated upon, on taking the aforesaid " handles one in each hand, will receive the electric fluid from " the machine, the operator raising or lowering the zinc plate " more or less in the liquid, according to the intensity required, " and it is this mode of regulating and governing the intensity of " of the electric fluid in electro-galvanic machines that constitutes " the prinčiple feature in this invention."

" There is also a trembler or vibrator, which indicates when " the machine is charged."

[Printed, 10d. Drawings.]

A.D. 1862, June 18.—N° 1801.

NEWTON, William Edward (*a communication from Pierre Nos d'Argence*).—" Improvements in electrical brushes."

The " box or frame " of the brush contains an induction coil with adjustable core and vibrating armature, also a galvanic battery. The wires " forming the brush are set in a sheet of " caoutchouc, and are brought into connection with the current " by the interposition of a wire gauze." " The cover or handle " of the brush is either metallic, or is provided with a metal con- " ductor, so that the operator's hand forms a part of the circuit." The battery " consists of a gutta percha vessel provided with " blocks of carbon and zinc plates, and a space to contain the " chemical substance, which in this instance is the deuto-sulphate " of mercury. The battery and its accessories are covered up and " enclosed by a lid, which is secured in such a manner that no " liquid can escape therefrom, so that the brush may without in- " convenience, be held in any desired position."

[Printed, 8d. Drawing.]

A.D. 1862, June 26.—N° 1879.

JOHNSON, John Henry (*a communication from Thomas Patten and Charles Mettam*).—" Improvements in the construc- " tion of electro-voltaic platework for medical and other pur- " poses."

"The essential feature of this invention is the forming of "articulated electro-voltaic platework in various sections through-"out the whole or major portion of its area by using two or "more tiers of negative plates in preference to one and interpos-"ing between such plates a series of 'positive' plates or by using "two or more tiers of 'positive' plates and interposing between "them a series of 'negative' plates. The upper and lower plates "should be so divided and kept separate longitudinally and "transversely as to establish a multiplicity of 'negatives' and "'positives' with their contiguous edges exposed and breaking "contact. The several sections of the 'positive' and 'negative' "plates are connected or hinged together by a flexible insulat-"ing strip or strips of india-rubber or other suitable material "united to the sectional plates by metallic or other eyelets. But "in order to give a more united character to the whole, and "facilitate the manufacture, it is preferred to connect the sections "of plates by a single insulating strip made with perforations or "openings therein so as to be of a skeleton form and admit of "the 'positive' and 'negative' plates, or rather those sections "which lie one under the other coming in contact and establish-"ing electrical action between or by the said plates or plate "sections."

The Specification describes, and the Drawings show, this invention applied to a "galvanic" "inner sole to be worn inside "boots or shoes."

[Printed, 8*d*. Drawing.]

A.D. 1862, June 28.—N° 1896.

BESLAY, Charles.—"Improvements in galvanizing or coating "metals by electro-chemical agency, and in apparatus connected "therewith."

This invention relates to improvements on N° 103 (A.D. 1859) and consists in electro-coating iron "by indirect means at the "ordinary temperature with non-concentrated solutions."

The "indirect means" employed, consists in first tinning the article to be covered.

The inventor uses "piles of peculiar arrangement with a single "element." "These improved piles" consist "of a leaden "vessel," the bottom of which "is provided with a thin sheet of "copper, which is movable, and turned up a little at the sides."

" Two wooden rods " are placed " longitudinally on the bottom of " the vessel," and on the said rods is placed " the thin sheet of " zinc, to which the conductors are fixed."

In using non-concentrated solutions, the inventor's object " is " not to form in the baths either stannates, zincates, or plombates, " which have a great tendency in concentrated solutions to pre- " cipitate in a crystalline state, and become more and more in- " soluble, sometimes forming gelatinous deposits, and conse- " quently presenting great resistance to electro-chemical decom- " position." " The principal object of this part of " the " im- " provements, on the contrary, is the formation of sub-salts of an " alkaline or acidulated nature, which are easily maintained in a " soluble state in slightly concentrated solutions."

[Printed, 4*d*. No Drawings.]

A.D. 1862, June 28.—N° 1903.

WEBSTER, John.—(*Provisional Protection only*.) The title of this invention is " Improvements in the means of protecting steam " boilers from incrustation."

This invention consists " in causing the earthy and saline " matters which heretofore have been deposited on the boiler to " be precipitated by electric currents on another surface. One " mode of carrying out the said invention is to set up an electric " action by the contact of two metallic surfaces; thus in an " ordinary steam boiler I place in contact with each other a sheet " of copper and a sheet of zinc (these I mention as the metals I " believe to be most suitable); these I immerse in the water in " the boiler, and I insulate them, as far as metallic contact is con- " cerned, from the boiler; it will then be found that all the earthy " and saline matters held in solution in the water will be deposited " on the said copper plate or plates, which can from time to time " be taken out of the boiler for the purpose of cleansing; the " the entire interior surface of the boiler will thus be preserved " clean. In tubular boilers tubes of copper and zinc placed in " contact and arranged so as to be readily removeable, may be " used as the means of collecting or throwing down the earthy " and saline matters. Or a chain or wire rope of zinc and copper " in contact can be made to travel round the surface of the boiler " or between the tubes. Other metals and substances may be

" used in order to set up the requisite electric action, and the " forms and arrangements in which they are applied may be " varied."

[Printed, 4d. No Drawings.]

A.D. 1862, July 2.—N° 1924.

DE LA BASTIDA, Eugène (*a communication from Albert Cohen & Charles Vaillant.*)—" A new method of manufacturing " India-rubber articles by the simultaneous combination of pres- " sure and vulcanization." Amongst other applications, this invention may be employed for covering electric telegraph cables.

The India-rubber article, formed from the usual sulphur compound of India-rubber, is put into a heated mould, and the whole is placed upon a press table and pressed, so as to perfectly close the mould; when the vulcanization is complete the mould is opened, and, if the whole of the article has not been operated upon, another portion is in like manner submitted to vulcanization and pressure, and so on until the whole article has been operated upon.

In covering wires or telegraph cables, " I cover the wire or " cable by spiralls mapping " [wrapping?] " around the same " india-rubber tape, or by any convenient means, I cover " them with india-rubber, and embed the wire or cable and " covering in grooves formed in plates, which plates or models " are put under the press and heated and vulcanized, as before " described, and if great lengths are required in one unbroken " piece, it is evident that by leaving the ends of certain lengths " unvulcanized, they may be most readily formed together by " means of a short mould and suitable press, and many miles of " unbroken wire or cable thus produced, having a perfect and " entire coating of vulcanized India-rubber."

[Printed, 4d. No Drawings.]

A.D. 1862, July 4.—N° 1948.

HOWARD, John, and BULLOUGH, John.—" Improvements " in warping and beaming machines."

This invention relates to " a means of stopping " the machine " when one or more of the warp threads break by means of a

"current of electricity." A mode of accomplishing the same object by mechanical means is also described and shown.

In the electrical arrangement, each thread of the warp supports a pin; the moment a thread breaks, its pin drops and completes the electric circuit of an electro-magnet, "having within its in-"fluence a catch in connection with the knocker-off piece." "Below the pins we have two conducting surfaces connected "respectively by wires to the negative and positive poles of a "battery, and placed in such positions that when the pins are "supported by the threads they can only touch one of the con-"ducting surfaces, but when one or more pins are lowered by "the breakage or absence of the threads, they come in contact "with both conducting surfaces, and thus completes the circuit "by forming a connecting link between the two poles. The "electric current thus established charges a magnet, which, by "attracting a catch or other agent, brings the knocking-off "piece into action and stops the machine. The thread being "again pieced supports its pin, thereby breaking the connection "between the two poles, so that the magnet having lost its "power cannot attract the catch or agent which brings the "knocker-off into action, and so the machine continues working "until another breakage or absence of thread allows a pin to "fall, which acts as before described and stops the machine."

[Printed, 2s. 6d. Drawings.]

A.D. 1862, July 8.—N° 1960.

SPENCE, WILLIAM (*a communication from Jean Didier Digney and Bastien Théodore Digney*).—"Improvements in telegraphic "apparatus."

This invention relates to improvements on "the French railway "telegraph."

In the "commutator," as in that described in N° 279 (A.D. 1858), alternate currents are produced by the oscillations of the contact lever or levers. In some arrangements two levers (one of which is a double-armed lever) are worked by the "sinuous "groove wheel;" in others, a stud takes the place of one of the levers; in one arrangement the indicator of the transmitting station is included in the circuit by the operation of a lever; the levers act upon springs instead of upon contact pieces in another arrangement; six arrangements are set forth in detail.

In the indicator, the electro-magnet is "connected to one of the "arms of a permanent magnet," thereby obviating the necessity for a "counteracting spring."

In one of the printing arrangements, the printing electro-magnet "can only come into action by the sufficient prolongation of one "of the contact pieces which, in the apparatus of the com-"mutator, cause the passing of the letters." In another printing apparatus, the circuit of "a supplementary battery" is only closed by a particular contact piece when the operator lowers "the "handle in the notch of the letter intended to be printed."

Froment and Bréguet's key "commutator" is made reversible by means of a lever with two arms oscillated by an eccentric. Another arrangement for this purpose consists of two wheel commutators with suitable springs, which "cause a transmission of "currents alternately in opposite directions."

[Printed, 3s. 2d. Drawings.]

A.D. 1862, July 17.—Nº 2044.

DICKSON, James.—"Improvements in the manufacture of "caustic soda and carbonate of soda," in which electric power is used in conjunction with chemical means to produce the desired result.

The electrolytes, from which the above-mentioned materials may be obtained, are:—

1st. Solutions containing chloride of sodium, nitrate of soda, and carbonate of soda contaminated with chloride of ammonium.

2nd. Solutions containing sulphide, sulphate, or sulphite of soda, and other soda liquors.

A decomposition cell to produce caustic soda from the above-mentioned electrolytes consists of an outer vessel or cathode of cast iron containing a porous cell and a carbon anode; the acids or elements that go to the positive pole are evolved from or deposited upon the anode, and the alkaline or metallic principles find their way into the outer vessel. It is necessary to use an intensity battery, and to apply heat to the apparatus to effect the decomposition properly.

When iodine or bromine are evolved as vapour, a porous cell, with a tight-fitting cover, is used in connection with tubes for carrying off the vapour.

When impurities accumulate on the surface of the anode, it may be made to revolve against scrapers, and thus to clean itself.

Some of the operations conjoin "the production of voltaic "electricity and carbonate of soda," also the employment of the electric power for other useful purposes.

Nos. 340 (A.D. 1862), 2101 (A.D. 1862), 2253 (A.D. 1862), and 2254 (A.D. 1862), are alluded to.

Many chemical processes are set forth in detail.

[Printed, 1s. 4d. Drawing.]

A.D. 1862, July 21.—N° 2070.

BAZIN, Ernest.—"An improved electric railway carriage "signal."

This invention consists of "the use of galvanized or zinked "coupling chains as a means of establishing electric communi-"cation between different parts of a railway train," together with a certain "arrangement of forked levers for signalizing "the rupture of a traction or coupling bar."

On the pulling of a cord, and the motion thereby of a lever and rod, by the passenger of a carriage, a pin on the rod makes electric connection between two plates, thus completing the circuit and actuating the hammer of an alarm bell near the guard. The motion of the said rod also raises a disc on the top of the carriage from which the signal is made. The connection of the cord lever with the rod is such that only the guard can return it to its normal position by moving the rod from the exterior of the carriage.

In case of the rupture of one of the traction bars between the carriages or trucks, a fork, which rests on the coupling chain, drops, and causes a spring to make electric contact between metallic plates in the electric circuit. The contact is made apparently by the percussion of the said spring. The completion of the electric circuit causes an alarm bell to sound on the engine.

[Printed, 1s. 6d. Drawings.]

A.D. 1862, July 24.—N° 2101.

DICKSON, James.—"Improvements in treating copper ores "and solutions of copper to obtain copper therefrom." In carrying out this invention electric force is employed.

1st. An acid solution of sulphate of copper is used in the negative compartment of a heated battery cell, and the copper reduced therefrom is caused to fall to the bottom, by means of a moveable stoneware "weight;" the solution is changed by means of a syphon, and the outer cell is cleansed from the deposited copper by means of an opening near the bottom of the said cell. In this arrangement an iron positive plate in a solution of sulphate of soda is used in an inner porous cell, the other or outer porous cell being charged with weak sulphuric acid.

Instead of sulphate of copper, chloride of copper may be used. Various chemical methods of obtaining these solutions are set forth.

Nos. 340 (A.D. 1862), 2044 (A.D. 1862), 2253 (A.D. 1862), and 2254 (A.D. 1862), are mentioned in this part of the invention.

2nd. The copper from crude copper is obtained in solution by using the said crude copper as positive plates in the above-mentioned voltaic arrangements.

Acid sulphate of copper may be decomposed into copper and sulphuric acid by the combination of a separate source of voltaic power with a heated decomposition cell containing the solution of copper in its outer cell and a carbon anode in weak sulphuric acid in its porous cell; sulphurous acid is passed into the porous cell solution. A porous cell may be dispensed with if sulphate of copper be freely supplied to the decomposition cell.

No 2044 (A.D. 1862) is alluded to in this part of the invention.

3rd. Metallic copper is obtained by fusing subchloride of copper in a crucible or decomposition cell with a carbon cathode, and containing a porous cell, in which common salt and an iron anode are placed. The porous cell may be dispensed with if carbon or crude copper is used as an anode.

[Printed, 10d. Drawing.]

A.D. 1862, July 26.—No 2124.

SELWYN, Jasper Henry.—"Improvements in apparatus employed in paying-out and raising electric telegraph cables."

"In paying-out and raising electric telegraph cables a buoy is "used, which is kept constantly at a distance from the machinery "or apparatus employed for paying-out or raising the telegraph "cable, in order that in the event of the telegraph cable breaking "the broken end may after it has left the paying-out or raising

" machinery have to travel a considerable distance before it can " arrive at the buoy; by this arrangement time is allowed after " the breaking of the cable for apparatus which the buoy carries " to come into action, and prevent the passing away of the broken " end of the cable." The said apparatus is suspended from the buoy and carries three grooved pulleys; two of these pulleys support the cable as it runs out or is being drawn in, and one of the supporting pulleys can traverse a certain distance, its bearings being moveable; the third pulley " is situated above the tele- " graph cable, but somewhat behind the rising pulley." When the cable breaks, the drag of the cable causes the moveable pulley to rise towards the upper pulley, " and thus the cable will be " tightly held between the lower and upper pullies."

If a constant strain be kept on the cable, it will be unnecessary to tow the buoy; but the buoy may be towed either by the vessel that carries the cable or by an auxiliary vessel.

[Printed, 1s. 4d. Drawings.]

A.D. 1862, July 28.—N° 2131.

DEVLAN, PATRICK SARSFIELD.—(*Provisional Protection only.*) This invention is entitled " Certain improvements in the manu- " facture of telegraphic cables."

The inventor states:—" My invention relates to a novel method " of constructing cables to be employed for telegraphic purposes, " such cables consisting of a number of insulated wires, collected " and arranged together to form the cable, and is designed for " the purposes of flexibility, durability, tenacity, and strength.

" The improvement consists in coating the wires to be insulated " with a composition consisting of about eight pounds of paper " or other fibrous pulp, half a pound of caoutchouc or gutta " percha, with one pound of resin or thereabouts. The composi- " tion is thus applied:—I take one or more of the ordinary con- " ducting wires, over which I put a complete coating of the " composition in any required thickness; this coating of the " composition is put on while the latter is in a soft condition, " and may be applied by suitable dies or 'drawing' machines " for the purpose; when the coating has become sufficiently dry " I braid or plait over it a covering of fine strong cord; over " this covering of cord I apply another coating of the composi-

" tion, and over it another cord covering, and so on until the " cable is completed."

[Printed, 4d. No Drawings.]

A.D. 1862, July 29.—N° 2153.

MAPPLE, James, and MAPPLE, Daniel.—(*Provisional Protection only.*) The title of this invention is " Improvements in " telegraphic apparatus."

The inventors state :—" The apparatus herein-after described is " for tracing telegrams in ink on a strip of paper.

"This invention consists of a flat endless chain, known as " clock or watch chain, rotated by a train of clockwork; and the " said flat chain is made to rub against an inking roller supplied " with common printing ink, and the strip of paper is made to " press against the inked surface of the chain by the attractive " force of an electro-magnet, and by these means the telegrams " are traced in ink in lieu of indentations produced by the " common Morse instrument."

[Printed, 4d. No Drawings.]

A.D. 1862, August 11.—N° 2238.

FENTON, Hugh, and STUBBS, William.—(*Provisional Protection only.*) " Improvements in telegraph wires."

" This invention has for its object improvements applicable to " telegraph wires, whereby their conductivity and partial or total " insulation and protection from atmospheric influences are ob- " tained, and without the necessity of galvanising the wires as " now commonly practised.

" These improvements consist in first covering the wires with " a thin coating of copper by immersing them in a bath con- " taining a solution of copper, or in any other convenient way, " and afterwards applying a coating or coatings of asphalt, black " varnish or of any other like suitable non-conductive substance " or substances; and in most cases it is preferred to introduce " into the asphalt or other outer coating a short fibrous substance " to insure its tenacity. The external coating may be applied to " the wire by immersing it in asphalt or or other substance when " in a heated state, and drawing it through a draw plate, or in " any other convenient way."

[Printed, 4d. No Drawings.]

A.D. 1862, August 12.—N° 2253.

DICKSON, JAMES.—(*Letters Patent void for want of Final Specification.*) "Improvements in treating zinc ores and solutions "of zinc to obtain zinc therefrom."

1st. A neutral or alkaline solution of zinc is poured into an iron decomposition cell, in which is placed a porous cell containing sulphuric acid and a carbon anode. By connecting an inexpensive voltaic battery with this arrangement and employing heat, metallic zinc is electro-deposited upon the iron cell. The porous cell may, in some instances, be dispensed with. In using a porous cell, the decomposition of the said solutions of zinc may be assisted "by employing in the said porous cell a carbon or other suitable "anode immersed in various acid, saline, or alkaline solutions as "positive electrolytes." The principal anodes employed are carbon, iron, and lead. "The principal positive electrolytes are "aqueous solutions of the sulphides of the metals of the alkalies, "or of the alkaline earths and similar solutions which contain "any of the said sulphides combined with sulphites or hyposul-"phites, aqueous solutions of the alkalies and alkaline earths, "aqueous solutions of sulphurous acid or of protochloride of "iron."

The solutions for decomposition are obtained, either by treating the ores of zinc (roasted or not) "with suitable acids, alkalies, or "salts," or from "voltaic batteries in which zinc has been used "as a positive pole."

2nd. Zinc is obtained "from its ores or from chemical com-"pounds of zinc," by subjecting the said ores or compounds in a fused state to the action of voltaic electricity. "Carbon or other "suitable anodes and cathodes" are employed.

[Printed, 4d. No Drawings.]

A.D. 1862, August 12.—N° 2254.

DICKSON, JAMES.—(*Provisional Protection only.*) "Improve-"ments in treating ores and solutions of lead to obtain lead "therefrom."

1st. A neutral or alkaline solution of lead is poured into an iron decomposition cell, in which is placed "a porous medium" containing hydrochloric acid and a carbon anode. By connecting an inexpensive voltaic battery with this arrangement and employing

heat, metallic lead is electro-deposited upon the iron cell. The porous cell may, in some instances, be dispensed with. In using a porous cell, the decomposition of the said solutions of lead may be assisted "by employing in the said porous cell a carbon or "other suitable anode immersed in various acid, saline, or alka-"line solutions as positive electrolytes." The principal anodes employed are carbon, iron, and zinc. "The principal positive "electrolytes are aqueous solutions of the sulphides of the metals "of the alkalies, or of the alkaline earths and similar solutions "which contain any of the said sulphides combined with sul-"phites or hyposulphites; aqueous solutions of the alkalies and "alkaline earths; aqueous solutions of sulphurous acid or of "protochloride of iron."

The solutions for decomposition are obtained, either by adding the ores of lead (roasted or not) "to aqueous solution of common "salt, or to other suitable solvents," or from "voltaic batteries "in which lead has been used as a positive pole."

2nd. Lead is obtained "from its ores or from chemical com-"pounds of lead," by subjecting the said ores or compounds in a fused state to the action of voltaic electricity. "Carbon or other "suitable anodes and cathodes," are employed.

[Printed, 4*d*. No Drawings.]

A.D. 1862, August 13.—N° 2265.

DICKSON, James.—(*Provisional Protection only*.) "Improve-"ments in the manufacture of chlorine for commercial purposes."

"Aqueous solution of chloride of sodium, common salt, sea "water, hydrochloric acid, the chlorides of iron, and other suitable "chlorides are heated and subjected in a decomposition cell to the "influence of a current of voltaic electricity;" the chlorine appears at the carbon anode. A porous medium or mediums may be used, although, in some cases, they can be dispensed with. To assist the decomposition, the following substances are amongst those employed:—"Nitric, nitrous, sulphurous, or sulphuric acids, "or oil of vitriol, the chloride or sesqui-chloride of iron, sulphate "or chloride of copper, peroxide of iron or of copper."

To liberate the chlorine, oxygen gas is passed "into or through "certain heated or ignited chlorides." The oxygen is obtained for this purpose, "either by the voltaic decomposition of acids,

" and salts which do not contain hydrochloric acid, or by the de-
" composition of alkalies in the said decomposition cell;" oxygen may also be obtained as a product of certain battery arrangements set forth in N° 340 (A.D. 1862).

Chlorine may also be obtained " from fused common salt, and
" from other suitable chlorides or fused compounds of chlorine,
" by immersing therein appropriate anodes and cathodes, which
" are then connected with the terminal poles of a voltaic battery."

[Printed, 4d. No Drawings.]

A.D. 1862, August 13.—N° 2266.

DICKSON, James.—(*Provisional Protection only.*) " Improve-
" ments in obtaining sodium from certain sources of that metal."

" This I effect by subjecting fused common salt to the action
" of a current of voltaic electricity applied thereto in suitable
" vessels by means of carbon or other suitable anodes and cathodes
" immersed therein; or I subject to similar treatment caustic or
" anhydrous soda, or suitable salts of soda when fused in suitable
" vessels. For an example, common salt is fused in a cast-iron
" vessel, into the said fused common salt is then immersed a car-
" bon pole, so as not to touch the said cast-iron vessel; a current
" of voltaic electricity is now passed by the said carbon pole or
" anode through the said fused common salt to the said cast-iron
" vessel, at the surface of which sodium is released, and collected
" by suitable contrivances. A partition of suitable material is
" used in the said iron or other vessel to separate the products of
" the said decomposition, and mechanical or other modifications
" of the said arrangement are used to obtain the said products of
" voltaic decomposition."

[Printed, 4d. No Drawings.]

A.D. 1862, August 14.—N° 2297.

SPAGNOLETTI, Charles Ernesto.—" Improvements in
" apparatus for signalling trains on railways."

To signal " trains on railways from one point to another when
" a train passes and when the line becomes clear," the inventor employs instruments " each having a dial and two finger keys."

The galvanometer needle of the signal instrument carries two light screens, one marked " line clear," the other " train on line."

The screen in front of the dial aperture depends upon the direction of deflection of the needle, and when no current passes, a part of each screen is seen, owing to the needle becoming vertical.

The metal finger keys turn upon centres, and carry contact pieces that make contact with certain contact screws and springs, so that "when the finger keys are both up, a current coming "through the instrument from the line wire is free to pass," and that, when a finger key is depressed, one battery terminal is "put "in contact with the line wire, whilst the other battery terminal is "put in contact with the earth connection." "The keys make "the contacts in opposite directions." Sockets near the keys enable a pin "to hold either of the keys depressed when re-"quired."

On a train passing station N° 1, the signalman N° 1 signals "train on line," to N° 2, who pins down his finger key; when the train passes N° 2, he signals "line clear" to N° 1, who also pegs down his key until there is occasion to alter the signal.

The screen and finger key connected with "line clear," are coloured white, those connected with "train on line," red. Distinctive colours are used throughout the arrangements of the instruments.

[Printed, 10*d*. Drawing.]

A.D. 1862, August 15.—N° 2305.

JOHNSON, JOHN HENRY (*a communication from John Henry Koosen*).—"Improvements in electro-magnetic timekeepers."

This invention relates to "a galvanic chronometer with centri-"fugal regulator."

1st. The "electro-magnetic machine" for working the chronometer.— Three vertical horseshoe electro-magnets have their poles equidistant in the circumference of a circle, the poles of the same name being alternate, and the poles of the same horseshoe magnet being opposite to one another. The actuating spindle of the machine is also vertical in the centre of the above-mentioned circle, and carries two soft iron bars which form the armatures of the electro-magnets, and are at right angles to each other. The several electro-magnets are magnetized successively, and "no "absolute interruption of the galvanic current can ever take "place." A modification of the wheel commutator regulates "the entrance of the current into the different coils;" gilt plates,

suitably connected by silver wire, are arranged upon a stationary wooden ring, and a brass arm, on the central actuating spindle, completes the requisite circuits during its revolution.

2nd. A "centrifugal regulator."—A steel rod, with brass balls, is pivoted at its centre of gravity, in a metal ring attached to and concentric with the main vertical axis. At a proper velocity the centrifugal force of the steel rod is exactly balanced by a blade spring in the electric circuit, but if the speed increases a wire on the rod breaks contact with the spring and interrupts the current; this latter action causes a slackening of speed until the wire again makes contact with the spring.

A Daniell's battery with horizontal plates and thick diaphragm of paper fibre is used, and more than one chronometer can be worked with the same battery.

[Printed, 10*d*. Drawing.]

A.D. 1862, August 16.—N° 2307.

GARSIDE, Henry.—"Improvements in machinery or apparatus for marking, etching, or engraving on cylindrical and other surfaces."

1st. "The employment for marking, etching, or engraving upon cylindrical surfaces of two frames used in connection with a pentographic arrangement;" slotted pieces communicate the motion from the instrument to the tool bar.

2nd. "The employment for marking, etching, or engraving upon cylindrical or other surfaces of two frames or tables, carried by or moving upon wheels or rollers, and actuated by a pentographic arrangement."

3rd. "The employment for engraving machines for cylinders of a castor for supporting the arm of the pentographic instrument which carries the tracing point."

4th. "The employment for engraving on flat or irregularly formed surfaces of a system of tools actuated by means of voltaic electricity in combination with electro-magnets attached to or connected with such tools." The pattern is drawn in non-conducting material, and the needle of a needle-holder is passed over the said surface in times equal to or proportionate to the passage of a revolving drill over the surface to be engraved. The electric circuit includes the pattern surface, needle and electro-magnet of the drilling instrument. When the electric circuit is

broken the drill is pressed by its spring towards the work, but when the circuit is complete "the drill is withdrawn by the arma-" ture impinging upon the adjusting screw."

5th. "The employment of magneto-electricity" "to actuate " the etching or tracing tools employed in electric engraving."

[Printed, 1s. 10d. Drawings.]

A.D. 1862, August 21.—N° 2334.

PARIS, Stanislaus Joseph, and BATE, William.—"Im-" provements in alphabetical electric telegraphs."

The communicator may either be driven by clockwork or by hand power. "The currents of electricity are transmitted by " means of a make-and-break wheel, with pins or teeth acting " alternately on anchor pallets or rollers." The two pallets "are " respectively in connection with the positive and negative poles " of the battery," and "are alternately brought in contact with " the pins" on the "make-and-break wheel;" therefore "the " currents passing through the line wire and indicator" are " alternately positive and negative." The make-and-break wheel is acted on by any one of the finger keys, so as to indicate the corresponding letter at the receiving station, by means of an arm, which stops the rotation of the wheel (by coming into contact with the depressed key) at such a part of its revolution as to indicate the required letter. After the passage of each pin against one of the pallets, it strikes against an adjustable "screw spindle;" each pallet is mounted in the same manner. When the zero key is depressed, a roller, at the extremity of a blade spring, presses into a notch in the make-and-break wheel and interrupts the circuit.

"The indicator consists of a dial, the finger of which is fixed " upon the front pivot of an arbor, which carries an escape wheel, " into the teeth of which two pins properly adjusted on a vibrat-" ing arm are made to work alternately, by means of a permanent " magnet working between the horns or poles of a pair of electro-" magnets. The escape wheel is held after each movement by a " spring detent and ratchet wheel."

"The alarum is made with a short train of wheels and an " escapement or a revolving hammer, to be released when a " current of electricity passes through a pair of electro-magnets."

[Printed, 8d. Drawing.]

A.D. 1862, August 22.—N° 2345.

RITCHIE, Edward Samuel.—" A new and useful improve-
" ment in the mariner's compass."

This invention " has reference to those marine compasses whose " cards are immersed in a liquid contained within a bowl or " case."

The invention consists " in the arrangement and combination " of an air vessel with the magnet or with the same and its card " in manner so as not only to encompass the magnet or magnets " and completely insulate the same from the surrounding liquid, " but also to buoy up the card and magnet, or the magnet or " magnets, or remove more or less of the weight thereof from the " pivot."

The liquid reservoir, the top of which is a glass plate, contains dilute alcohol, and has the pivot of the compass card projecting upward from the central part of its bottom. To the under side of the card an air-tight chamber is affixed, the magnet or magnets being enclosed within such chamber. " The said air vessel is " perforated so as to permit the pivot" " to pass through it to the " cap." The cap is screwed and fastens the card, the flange of the air vessel, and a hollow frustrum of a cone together. " An " elevator" " is placed below the conic frustum" " for the pur- " pose of lifting the cap from the pivot when the compass is not " in use."

This invention protects the magnet or magnets from oxidation.

The Drawings show two sets of magnets, one on each side of the axis, parallel to each other, and standing up edgewise in the air-tight chamber.

[Printed, 8*d*. Drawing.]

A.D. 1862, August 26.—N° 2368.

RIDER, Joseph.—(*Provisional Protection only.*) The title of this invention is, " Improvements in the construction of fencing " posts or standards, to be used either for straining or otherwise " sustaining fences, the said improvements being also applicable " to all kinds of gate posts, telegraph poles, signal posts, or other " upright standards or pillars."

The inventor states :—" In making such posts, poles, standards, " or pillars I mostly use sheet iron or other thin plate, and I

" construct them in section of a diamond, square, or other " straight-sided figure, whereby I obtain considerable strength. " Also I sometimes construct such posts, poles, standards or " pillars of triangular section, or of serrated or indented section " as will be more particularly delineated in the Drawings intended " to accompany my Final Specification. In making the joints of " these posts, standards, or pillars I prefer to use a lap joint, " and after hammering or rolling the sheet iron or other thin " plate to the form required to close the lap joint by soldering, " galvanizing, or rivetting, or any two or more of these means, " but I do not restrict myself to the use of lap joints.

" My improvements also consist in bushing the holes in such " posts, pillars, or standards through which strained fence wire " passes, such bushing may be carried into effect by using for " the purpose sheet iron, thin plate, or other piping or tubing " secured in the said posts, pillars, or standards."

[Printed, 4*d*. No Drawings.]

A.D. 1862, August 30.—N° 2410.

JOHNSON, John Henry (*a communication from Charles François Leopold Oudry*).—" Improvements in coating or cover- " ing metallic surfaces with copper."

" This invention relates to the coating or covering of wrought " or cast iron, zinc, or other metallic surfaces with copper by " means of the magneto-electric or electro-galvanic processes, and " consists in the employment of certain peculiar compositions," " or other compositions of an analogous nature, which are " applied by means of a brush or other suitable method to the " metallic surfaces to be coated with copper before placing them " in the cupreous bath for the purpose of forming an intermediate " coating between the copper to be deposited and the metallic " surface to be covered or coated, thereby avoiding the deleterious " action which arises frequently when the copper is in immediate " contact with the metal upon which it is deposited."

The first of the above-mentioned compositions contains copal, resin, minium, walnut oil, and " benzole or naphtha;" the second contains copal, resin, " silica, or other suitable silicates," " boiled linseed oil," minium, and " benzole or naphtha;" the third contains copal, resin, " caoutchouc in solution," boiled lin-seed oil, " coal tar naphtha," benzole, and minium; the fourth

contains copal, resin, sulphur, walnut oil, benzole or coal tar naphtha, and minium.

After applying any one of the above compositions to the surface of the metal to be coated, the said surface "is covered "with powdered graphite" before being immersed in the cupreous bath.

To repair any defects in the coating, a "solder" may be used which contains "galvanic copper," wax, copal, and resin.

[Printed, 4d. No Drawings.]

A.D. 1862, September 2.—N° 2431.

THOMPSON, JACOB BAYNES.—"Improvements in electro-"magnetic machines."

An electro-magnetic motive power engine consists of a number of flat electro-magnets arranged in two series, one active whilst the other is inactive. By this means the opposite sides of a beam or lever are alternately acted upon, so as to rotate a fly-wheel shaft by means of a connecting rod.

The electro-magnets, in one series, slide upon guide bars, and can either be in contact, piled one above the other, or removed a slight degree from each other, being connected together by means of slotted links. The depth of the slots determines the maximum distance each electro-magnet or "plate" can be removed from its neighbours, and the length of stroke is equal to the said distance multiplied by the number of spaces between the plates in one series. The electric current is admitted to that series of electro-magnets which have been drawn apart by the closing of the other series; when the plates are in contact the current is admitted to the other series which, in its turn, separates the series already attracted.

On each face of each plate a number of raised magnetic poles are formed and disposed so that poles of different names shall be contiguous. "Each preceding magnet carries also the coil of the "succeeding magnet." The poles on neighbouring magnets that are opposite to each other are of different names, and therefore act with mutual attraction.

Another plan is to coil the magnets in concentric rings, each alternate ring being of the same polarity.

[Printed, 10d. Drawing.]

A.D. 1862, September 2.—N° 2432.

BROOKE, Sir William O'Shaughnessy.—(*Letters Patent void for want of Final Specification.*) "Improvements in the "construction of submarine telegraphic cables."

"The object of this invention is so to construct a submarine "telegraphic cable for deep sea lines that its specific gravity, and "consequently its rate of sinking as it is laid, can be regulated "with precision, and a further object of the means of construc- "tion which I adopt is the protection at the same time of the "telegraphic core against friction and other ordinary causes of "mechanical injury. These objects are attained by the use of "wooden tubes which are threaded on to the telegraphic core. "For the construction of the tubes American beech is preferred "impregnated with drying oils or melted paraffine under great "pressure; the usual length of the tubes is four inches, and the "usual diameter one inch, but these dimensions may vary, and "other woods may be used. The core is enclosed in hemp or "silk lines rendered waterproof, and preserved by any suitable "preparations and coated with tape. Between the ends of the "wooden tubes are interposed elastic discs or joints of caout- "chouc, flexible vulcanite, canvas prepared with caoutchouc, "leather or hemp saturated with paraffine, wax, marine glue, or "other oleaginous or resinous substances, or other flexible ma- "terial may be employed, the object being to give flexibility to "the cable with due protection to the core. To regulate the rate "of sinking there may be interposed at certain intervals tubes of "iron, wood, lignum vitæ, or other dense woods, or of marble "instead of the ordinary tubes of wood lighter than sea water."

[Printed, 4d. No Drawings.]

A.D. 1862, September 3.—N° 2442.

BROOMAN, Richard Archibald (*a communication from Theodore Auguste Marie Sortais*).—(*Provisional Protection only.*) "Improvements in apparatus for transmitting electric telegraph "messages and signals."

This invention is for improvements upon the invention set forth in N° 2864 (A.D. 1858). The present improvements "are "described with reference to a printing or writing telegraph, but "they are equally applicable to all telegraphs."

At each manipulation, a spring, attached to the lever of a Morse instrument, engages and disengages the click of a ratchet wheel. The said ratchet wheel is mounted with a lever carrying a weight at one side, and with a lever carrying a stop to the clockwork on the other side; there are also stops to limit the amount of rotation of the ratchet wheel, a catch on the axis of a pinion of the wheel-work, and a highly flexible spiral spring by which the stop of the fly is connected to the fly shaft. During manipulation the clock-work is free to actuate the telegraphic mechanism, the above-mentioned weight being allowed to preponderate and admit of the uninterrupted rotation of the fly axis. When the manipulation is finished, the catch on the axis of the pinion gradually restores the ratchet wheel, weight, and stop, to their original positions; the highly flexible spiral spring allows the fly axis to revolve a sufficient time to disengage the catch.

The paper is unwound from a drum, led between guide rollers, then passes under the pen, and is thence drawn off by a pair of drawing-off rollers.

[Printed, 8*d*. Drawing.]

A.D. 1862, September 6.—N° 2461.

SNIDER, JACOB, junior.—" A new and useful method of in-
" creasing the durability of, and for preserving cloths and other
" like fabrics used for sails, tarpaulings, tents, and other cover-
" ings; also all kinds of ropes and cables and *telegraph wires;*
" also all woods, metals, and other materials used in buildings or
" constructions, on land or on water, and all objects exposed to
" the action of acids, alkalis, gases, fire, fresh or salt water,
" atmospheric or other like destructive influences, by the ap-
" plication of graphite."

A certain " composition," and a certain " paint " are made use of in this invention; in each of these " graphite is the principle" [principal?] " element or base," and they are described in N° 3024 (A.D. 1861).

" In the application of graphite as a preservative of all kinds of
" ropes, cables, fishing nets, and telegraph wires, an application
" of the 'graphitic composition' in a heated state must first be
" made by immersion of the objects therein or otherwise, and then,
" when perfectly dried, I add to said objects one or more coatings
" of the 'graphite paint' by immersing the ropes, cables, or wires

" therein or otherwise. The application of this process, or any " similar use of any 'paint or composition' of which graphite is " a principle element or base, is one of the essential features of " my invention, as my invention is also for the better preserving " of fishing nets and nets of all kinds, and for twines, cords, or " cordage for all purposes."

[Printed, 4*d*. No Drawings.]

A.D. 1862, September 9.—N° 2479.

MAURICE, JOSEPH.—(*Provisional Protection only.*) " Im- " provements in the construction and preservation of ships and " vessels."

1st. " An addition or additions to be made to the sides of " vessels, whether new or old."

2nd. " Protecting the hulls of such or other ships or vessels." " To protect the iron surfaces of ships and other vessels I de- " posit, by galvanic, electric, or chemical action, copper or other " suitable metal from a metallic solution. This I effect upon the " exterior surface of a completed vessel in a suitable dock or " basin containing the metallic solution, or upon the interior sur- " face of such vessel by placing the solution within the same and " setting up the necessary action or agency in the usual manner. " Instead of acting upon the entire surface at one time I prefer, " in some cases, to form the protective coating by a series of " operations by means of suitably-shaped vessels applied to the " surface to be operated upon, the contact of each vessel in the " shape of a box or case being made perfect by an elastic edge, " which is capable of conforming to the irregularities of the sur- " face to be operated upon, the metallic solution being held " within it. A series of the plates or parts of the vessel may be " electrotyped or coated with metallic deposit previous to being " rivetted together, and the joints or joinings or any other un- " protected parts may afterwards be coated seperately in the " manner described."

[Printed, 4*d*. No Drawings.]

A.D. 1862, September 10.—N° 2488.

HANDS, FREDERIC, and HOLLAND, HENRY.—" New or im- " proved compositions for the manufacture of black ornaments,

"such as brooches, bracelets, earrings, and other ornaments "usually made of jet, which said compositions may also be "applied to the manufacture of various other articles;" amongst other articles, the said compositions are applicable to the manufacture "of buttons and knife handles, inkstands, and *electric telegraph insulators.*"

A composition to be used "in the manufacture of bulky articles "such as inkstands," contains powdered jet, "black oxide of "manganese, or other black pigment, such as drop black," "black varnish," India-rubber, and gum arabic. The India-rubber is dissolved in the varnish by the aid of heat, the powdered jet and the black pigment are then added; to this mixture a concentrated aqueous solution of gum arabic is added, and the whole of the materials thoroughly incorporated.

"In moulding articles we use our compositions cold, and the "moulded articles are stoved to harden them, and are finished "and polished in the same way as articles made of jet."

"Articles made of the said compositions require to be stoved at "a higher temperature than that employed to stove japanned "articles."

In some cases the India-rubber is dissolved in "coal naphtha," and the mucilage from Irish moss in combination with isinglass and gum arabic may be used instead of gum arabic.

Electric telegraph insulators are not explicitly mentioned in the Provisional Specification.

[Printed, 4*d*. No Drawings.]

A.D. 1862, September 19.—N° 2574.

IMRAY, JOHN (*a communication from Mattheus Hipp*).—"Improvements in apparatus for telegraphing and signalling by "means of electricity."

1st. "Apparatus for actuating the distance signals of railways." —The detent of certain clock mechanism which acts upon the vane or light of the signal, is withdrawn by electro-magnetic apparatus operated by the handle of a manipulating apparatus at the station from which the signal is to be worked. Bells are arranged at the station so as to persist ringing during the continuance of the danger signal, but the change of position of the vane breaks electric connection with the bell apparatus. Miniature vanes,

which copy the movements of the signal vanes, are arranged in a short but highly resisting circuit at the station.

A method of arranging ship or other signals, which require six or more different positions of the vane, is set forth in detail.

The distance signals may be worked by passing trains that make or break electric contact by depressing a lever.

2nd. The successive positions of a train may be shown by the successive motion, of an index at the station, worked by electric contacts along the line in connection with apparatus similar to that above explained.

3rd. Writing or printing telegraph signals.—A modification of the Morse alphabet is used, in which the ordinary strokes are replaced either by strokes at right angles to the line or by a dot marked on a lower line. Two sets of keys and two markers are employed, one set and its marker to send positive electric currents, the other set and its marker to send negative electric currents. The marks are made either by styles and ink bands or by rollers and a trough of colour. Certain levers complete the circuit past the manipulating instrument when the keys are not in use. Two levers in connection with a perforated roller covered with paper, may be used to transmit the above-mentioned signals.

[Printed, 1*s*. 6*d*. Drawings.]

A.D. 1862, September 20.—N° 2580.

FANSHAWE, HENRY RICHARDSON.—"Improvements in the " mode and means used in fishing in seas, rivers, and other " waters."

This invention consists in " the employment of a submerged or " subaqueous light for the purpose of alluring or decoying fish, " and thereby facilitating their capture, which light may be de- " rived *from electricity*, or from the ignition of oil, or of gas, or " from phosphorized oil, or other luminous fluid, or by any means " for producing or maintaining a light under or below the surface " of the water, or by reflecting natural or artificial light from " above the surface of the water upon submerged reflectors."

"The illuminating apparatus may be lowered to the required " depth by any mechanical arrangement which will answer the " purpose desired," but the inventor prefers to use a boat fitted with a central well " for the purpose of more conveniently superin- " tending the working or adjustment of the decoy arrangement,

" aid of seeing when a sufficient number of fish are collected, so
" that the boat may be removed for the purpose of closing the net
" or nets."

" When the electric light is employed the lantern may be sunk " before ignition, and the light extinguished before its with- " drawal." The lantern may consist of a polished reflector, in an " obscured part of the same, that concentrates all the rays of light " that it receives from above the water upon a " bent pane of " glass in obscured portion of the lantern." " If the radius of " the fishing ground be of very considerable extent it may be found " desirable to employ an electro-galvanic or other light of a " brilliant nature, when either the light diffusing or light concen- " trating form of lantern " " will be found suitable."

[Printed, 8*d*. Drawing.]

A.D. 1862, September 23.—N° 2591.

MAPPLE, JAMES, and MAPPLE, DANIEL.—(*Provisional Protection only*.) This invention is entitled " Improvements in tele- " graphic apparatus."

The inventors state :—" This invention consists of a flat end- " less chain rotated by a train of clockwork, and in its rotation it " is made to rub against an inking roller supplied with printing " ink, and so forming a tracer; a strip of paper is likewise carried " forward by the said clockwork, and the said strip of paper is " made to rub continuously against the tracer, and the contact of " the tracer with the paper is broken or the paper is pushed away " from the tracer as may be desired, to give the signals by the " attractive force of an electro-magnet, which magnet pulls an " arm down and presses the paper away from the tracer, in con- " tradistinction to William Spence's Patent (communicated to " him by Digney, freres), No. 279, of 1858, in which the arm " moved by the electro-magnet presses the strip of paper against " the tracer. We purpose reading the telegrams by the white " spaces instead of the inked lines of other tracing instruments, " as by our arrangement the instrument is capable of being worked " with a smaller amount of power than any other tracing instru- " ment."

[Printed, 4*d*. No Drawings.]

A.D. 1862, September 25.—N° 2611.

ALEXANDER, Robert.—(*Provisional Protection only.*) "Im-
"provements in mariners' compasses," for the purpose of compensating for local attraction.

1st. "The application of counteracting magnetic poles, either "arranged in the compass or upon the needle card, or otherwise."

2nd. "The use of a moveable magnetic ring attached to the "needle card, or so placed as to revolve therewith."

3rd. "The use of an apparatus to be attached to the magnetic "ring for regulating the compensating or counteracting polarity "of the ring, and for adjusting the same when required, and "compensate for the displacement of the polarity of the needle "caused thereby."

4th. "The use of aluminum iron, iron alloyed with nickel or "other ironide for magnetic compass cards."

5th. "The use of iron alone or alloyed for the bowls, rims, "hoods, and binnacles of mariners' compasses." The said bowls, rims, hoods, and binnacles may be "painted, japanned, glazed, "tinned, zinked, or galvanized."

"The two latter (4th and 5th) improvements" may be "applied "in conjunction with the three former."

6th. "The application of the said counteracting and compen-"sating apparatus and principle to magnetic needles of common "compasses, and to the magnetic needles of telegraphic or other "instruments."

[Printed, 4d. No Drawings.]

A.D. 1862, September 25.—N° 2619.

POTTER, Arthur.—(*Provisional Protection only.*) "Improve-"ments in electro-magnetic engines."

"This invention relates to the means of obtaining electro-"magnetic motive power by direct rotary motion, and the engine "consists of a fixed circle or band of soft iron bars screwed "straight across the inside edges of two or more stout wheels, "the widths of these bars are to correspond with the thickness "of the coils of the electro-magnets to be used, the distance "between each bar is to be double that of the width of the bars "themselves, the number of bars to be used in the circumference "of the wheels may vary according to the measurement of the

" circumference, which measurement must be equally divided by " the thickness of the cores of the electro-magnets. The axle or " shaft of the engine is to be set in bearings supported by " standards from the foundation plate, and its centre will be " also the centre of the circle of bars which form armatures for " the electro-magnets attached in radial lines to the central shaft."

" The invention relates also to a break for connecting and dis- " connecting the electric current which consists of metallic plates " studded with platinum points and insulated from the axle and " from each other." " Platinized rollers with spring bearings" place the electro-magnets suitably in circuit with a galvanic battery. " Two platinized spring breaks are to be connected " with the two opposite poles of a battery, and alternately to " make connection with the shaft and an insulating material half " surrounding the same." By these arrangements the poles of the electro-magnets are reversed at every revolution, and permanent polarity is prevented.

" In order to reverse the engine a second break is to be attached " to the shaft, or the platinized rollers may be shifted by a " revolving gear."

[Printed, 4*d*. No Drawings.]

A.D. 1862, October 3.—N° 2670.

ROBOTHAM, Thomas John, and OSWALD, Edward.—(*Provisional Protection only.*) " Improvements in apparatus for " purifying 'glaze,' 'slip,' or other potters' materials."

" The apparatus consists principally of a vertical shaft with " four or more horizontal or inclined arms projecting therefrom, " and provided with any convenient number of permanent or " electro-magnets, which shaft is caused to revolve (by means of " any suitable gearing) in a vat or circular vessel containing the " 'glaze' or other material, so as to come into contact with and " take up every particle of iron or other magnetic substance that " may be incorporated therewith. When electro-magnets are " used attached to the horizontal arms the positive ends of the " wires are collected together into one bundle and the negative " ends into another, so as to form two separate bundles of wires, " and to each of these bundles a thick copper wire is soldered " and conducted up the shaft. Each of these wires is made to

"dip into a separate cup of mercury of which there are two "attached to the shaft and revolving with it, and these mercury "cups are respectively connected with the positive and negative "poles of a galvanic battery so as to complete the electric "circuit."

[Printed, 4d. No Drawings.]

A.D. 1862, October 3.—N° 2675.

DALRYMPLE, ALEXANDER. — (*Provisional Protection only.*) "Improvements in the processes of depositing metals by gal-"vanic action either with or without the aid of galvanic bat-"teries, and in the ornamentation of metal surfaces thereby."

1st. "Processes employed in depositing metals by galvanic "action" "applicable to the ornamentation of metal surfaces." —Either the pattern of the ornament is left clear of the non-conducting stopping-out varnish, or the ornament is entirely covered with the varnish and the pattern is chased through the same. A "bed" is then formed by electro-etching the pattern. Metal is then electro-deposited into the pattern, and the varnish is removed.

Copper may be deposited in the pattern of a zinc ornament by merely immersing the said ornament in a solution of sulphate of copper.

An electro-plated article may have the pattern electro-etched only to the extent of the thickness of the electro-plating, and the electro-etched portion afterwards filled up with deposited metal.

For cutlery, the exposed portions are eaten out deeply, then partially filled in with zinc and electro-plated until a level general surface is produced.

For producing patterns in different kinds of metal the article is varnished over for each separate pattern.

A stencil plate, in conjunction with wax and varnish, may be used to produce a pattern, the wax being ultimately removed.

2nd. "Forming moulds or dies in iron by galvanic deposition." —Iron is electro-deposited upon a black-leaded pattern by means of a solution of sulphate of iron; half the pattern is operated upon at once. "If the moulds or dies so formed are to be employed "for stamping, they may be case-hardened, and afterwards brazed "on to a solid piece of metal."

[Printed, 4d. No Drawings.]

A.D. 1862, October 10.—N° 2734.

BAGULEY, George, and GREENER, Henry.—(*Provisional Protection only.*) " An improved construction of insulator for " telegraph wires."

" The object of this invention is to secure telegraph wires in " position on or in their insulating supports without wire bind- " ings or other attachments, as commonly employed. This we " effect by forming the insulator with a longitudinal slot for " receiving the telegraph wire, and we gain access to the slot for " the insertion of the wire by making a zig-zag opening in the " side thereof. By this arrangement the tendency of the wire " (through the continued action of the wind upon it) to escape " from its seat is completely checked."

[Printed, 4*d*. No Drawings.]

A.D. 1862, October 14.—N° 2772.

MONCKTON, Edward Henry Cradock.—" Improvements " in coils of induction, and in obtaining and applying power by " means of electro-magnetism."

In the Provisional Specification, the inventor's " attracting " medium," and its application to induction coils and electro-motive power engines are chiefly set forth.

The Final Specification is divided into the following heads:—

1st. " Galvano-magnetic electricity."—A Smee's battery is applied in succession to a large number of electrical condensers which are discharged simultaneously at very frequent intervals. " Galvanic action" is introduced " into magneto-electric ma- " chines."

2nd. " Coils of induction and electro-magnets."—To form an induction coil, a core of thin sheet iron is wrapped round with thin sheet conducting metal, each fold being insulated; or the sheet iron may be continued " throughout the entire induction " coil in an alternate fold with the conducting metal." To form an electro-magnet, the conductor, in thin sheet, is laid upon a thin insulated sheet of iron, " the two sheets are then to be folded " in any required direction."

3rd. " Mechanical arrangements," by which electricity " is to " be applied for obtaining power."—" In lieu of helices,"

"attracting mediums" are constructed by placing insulated coils upon a curved sheet of metal, the said coils being one over the other or round the inside of a frame; or, insulated wire may be wound alternately round pegs placed at each end of the said curved sheet; a cylinder, constructed partially of iron, may be made to revolve by the electro-magnetic power obtained by the use of the "attracting mediums," the said cylinder being placed inside the said frame. "Alternating levers" and cog wheels, horizontal wheels running on castors, and other arrangements involving the advantages of leverage and tangential attraction, are set forth in minute detail.

Many details relating to galvanic batteries, coils, condensers, electro-magnets, and modifications necessary to apply electro-magnetic power to useful purposes, are set forth minutely.

[Printed, 10*d*. No Drawings.]

A.D. 1862, October 18.—N° 2815.

FULLER, JOHN.—"An improvement in treating India-rubber "used on a wire or wires for insulating the same."

"My invention consists in treating india-rubber after it has "been placed on a wire or wires to insulate the same for electric "telegraph purposes, by first applying thereon naptha or other "solvent, water or other matter that will render the surface of "the rubber covering damp or adhesive, then powdering or other- "wise applying sulphur, and exposing the rubber so treated to "heat in order to 'cure' the same. Or, before the curing more "India-rubber may be applied on the sulphured India-rubber, and "the curing may be effected after the additional India-rubber has "been applied."

[Printed, 4*d*. No Drawings.]

A.D. 1862, October 22.—N° 2845.

WILDE, HENRY.—(*Letters Patent void for want of Final Specification.*) "Improvements in electro-magnetic telegraphs."

This invention relates to "improvements in the transmitting "instruments," described in N° 858 (A.D. 1861) and N° 1994 (A.D. 1861).

The magneto-electric machine described under the head of the third improvement of N° 1994 (A.D. 1861), is mounted so that its

armature axis has motion "in a lateral direction parallel with "itself," as well as a rotary motion; this reciprocating motion of the axis is communicated to the radial arm and to the index finger, by means of two smooth collars fixed on the axis, a lever, and intermediate wheelwork. The said reciprocating motion is caused by the attraction of the armatures in opposite directions, as they alternately pass the poles of the permanent magnets in revolving before them.

The requisite alternate currents are sent into the line wire by means of the above-mentioned lever in combination with two contact screws. "So long as a key is not pressed down the inverted "currents act uninterruptedly on the indicating instruments "placed in the telegraphic circuit;" but, when a finger key is depressed, the radial arm stops, the reciprocating motion of the armatures is arrested, the lever is only able to touch one of the contact screws, and consequently the indicating instruments (which require alternate currents) are unaffected, and their pointers stopped at the letter corresponding to the finger key acted upon.

"The currents from a number of magneto-electric machines "geared together may be regulated by the reciprocating motion "of any one of the armatures of such machines in the manner "described by connecting up all the wires in a suitable manner "with the vibrating lever."

[Printed, 4d. No Drawings.]

A.D. 1862, October 24.—N° 2863.

VIGNEULLE-BREPSON, ANNE JEAN FERDINAND.—"A "siphoidal cistern with water reservoir for kitchen or other drains "in communication with infected sewers."

"The siphoidal cistern" "is composed of a basin constantly "full of water to submersion of its top edge, so that on pouring "any more in the pressure causes the level to rise, and the over-"flow takes place through large vent holes or outlets suitably "disposed, and the waters run off leaving the basin always full to "the same level as before."

In some cases, warning is given, "by the electrical ringing of a "bell when the cistern or trap becomes choked and requires "cleaning or flushing." "This trap is intended to be fitted in "remote places where there is a liability of its becoming chocked "up by mud or dirt," "in which case the water rising in the

" reversed basin," " will bear on a special valve," " causing it to " move and set in action the electric alarm bell, when the per- " sons in charge will raise the vent plug," " by the ring " " and " rope."

The application of an electric alarum to giving warning, when the trap becomes choked, is not mentioned in the Provisional Specification.

[Printed, 1s. 4d. Drawings.]

A.D. 1862, October 28.—N° 2904.

DUNCAN, Charles Stewart.—" An improved compound or " material for coating or covering metallic and vegetable sub- " stances to preserve them from corrosion or decay."

Amongst other uses, the said compound " is well adapted to " coating and preserving " " telegraph posts," " previous to their " being coated with paint, varnish, pitch, or tar."

" The material or compound is to be made as follows :—I pro- " pose to use marine glue, gutta percha, india-rubber, shellac, " copal, mastic, vegetable or mineral pitch or tar, or resin, or " iodine, or sulphur, or creosote, or asphalte bitumen, and coal " tar in combination with one or more of the following sub- " stances :—alumina, schist, quartz, slate, silex, or flint, marble, or " pozzolano, sand, sandstone, cement (natural or artificial), chalk, " glass, emery, tripoli, white oxide of zinc or of lead, or the " litharge or red oxide of lead, in every case reduced to a fine " and nearly impalpable powder."

The materials are to be heated and reduced to a plastic state, and, while in this heated state, the coating is laid on with brushes; the article to be coated, if of metal, is also heated. Before the coating cools, it is " to be covered with a layer of one or more of " these mineral powders before mentioned in a warm state, in " order to entirely remove all stickiness or tack."

The article may receive " a further protective coating or varnish " composed of copal, cupreous, or other varnish, or naptha, paraf- " fine, camphine, petroleum, or other mineral or vegetable oils, or " silicate of potash or of soda and sulphuric acid mixed with one " or more of the above-named pulverized substances."

[Printed, 4d. No Drawings.]

A.D. 1862, October 29.—N° 2912.

CLARK, WILLIAM (*a communication from Pierre Pradel*).—
" Improvements in apparatus for ascertaining and recording the
" speed and distance travelled by vehicles, the flow and quantity
" of water, and other analogous purposes."

One of the purposes to which this invention may be applied is to "*the reproduction of telegraphic dispatches.*" "By a peculiar " arrangement, the principle of which is based on the organiza- " tion of various modes of pointing which may be applied on the " band, the apparatus may" "be usefully employed in the repro- " duction of telegraphic dispatches."

The apparatus is called a "diergraph."

"The principal features of novelty on which the present inven- " tion is based are as follows:—1st, a band of paper of a suitable " width and of a certain length, without any previous prepara- " tion is wound on a reel or bobbin, and is replaced by another " when used up;" "2ndly, two cylinders are suitably disposed, " which carry a band with them in their chronometric motion, " which strip is graduated to an extent according to the purpose " for which it is required, and divided into fractions of hours, or " by measures according to each impulse imparted, by means of " points projecting on one of the cylinders, and taking into the " other one in the manner of toothed gearing; 3rdly, a series of " piercers of various forms indicative of the nature of the opera- " tion, are caused to pierce the band at the divisions without " arresting its progress at the moment where the controlling " action is accomplished, that is to say at its commencement " and termination, according to the order previously determined " by the nature of the operation."

The Provisional Specification contains no allusion to the application of this invention to "the reproduction of telegraphic " dispatches."

[Printed, 1*s*. 6*d*. Drawings.]

A.D. 1862, November 4.—N° 2986.

LÜDEKE, JOHANN ERNST FRIEDRICH.—(*Provisional Protection only.*) "Improvements in magneto-electric apparatus for " obtaining and applying motive power."

A pendulum, carrying permanent magnets, is allowed to vibrate over "needles" clamped by a double brass bar that is free to have a rocking motion. In connection with the said needles are certain studs, cords, and bell-crank levers, "with small friction "wheels to act against the surface of the pendulum." The "alternate rocking motion of the needles," produced by the vibrations of the pendulum, causes the "descending arm of each "bell-crank lever" to be "simultaneously forced against the "side of the pendulum, thereby producing a continuous motion "of the apparatus."

In a modification of the invention, a series of horizontal permanent magnets is fixed within a drum. The drum is capable of rotation independent of the said permanent magnets, and carries a row "of the rocking needles" on each side of its periphery. As the needles pass the poles of the magnets "they will become "magnetized, and diverge the one series to the north and the "other to the south, as in the first form of apparatus, and a con-"tinuous rotary motion will be effected by these influences."

In another modification, a fixed axis, passing through the centre of a rotating drum, "supports a series of permanent magnets. "As in the last instance, four or more rows of rocking needles "are set in bearings from end to end of the cylinder." "The "influence of the magnets upon the armatures of the rows of "rocking needles and the attraction created thereby will com-"municate a rotary motion to the cylinder," and thence to a driving shaft.

[Printed, 4d. No Drawings.]

A.D. 1862, November 4.—N° 2988.

WALL, ARTHUR.—"Improved processes for purifying lead and "extracting and separating silver therefrom, and in machinery "for those purposes."

This invention consists in the application of electricity or "electric currents" "to the purification of lead, and separation "of silver therefrom."

Crude lead is melted in a pan, then conveyed "through a pipe "having a stop-cock" to another vessel "placed at a lower level, "where it undergoes the first process of separation and purifica-"tion," thence it is similarly conveyed "to a third or more "similar cylindrical vessels, where the process is completed."

Stirrers may be made to rotate in the pans, and the separation of "the silver alloys and other impurities" "is effected by the application of suitable menstruums, and by exciting their molecules "by electric currents."

One process for extracting the silver from lead is "by the use "of electricity combined with the action of gases, such as chlorine or ammonia, being forced into the fused lead through a "tube or tubes."

"The lead may be poured into a heated vessel containing perforated tubes, placed near each other, filled with chemicals, and "electricity being applied, the lead would, as it passed along in "a subdivided state, part with its silver and impurities."

When gases are used in connection with electric currents, in order to purify the lead, the direction of the electric currents is reversed from time to time.

When "there is no outlet at the bottom of the pan for running "off the silver," the above "electrolytes or menstruums" are used to oxidize the impurities of the lead. In this case the pan is the "oxygen pole" and the stirrer the "hydrogen pole of the "battery alternately."

Other details are set forth.

[Printed, 10*d*. Drawing.]

A.D. 1862, November 5.—N° 2992.

JOHNSON, WILLIAM (*a communication from Hugh Ross M^cKenzie*).—(*Provisional Protection only.*) "Improvements in "the arrangement and construction of pillars or standards for "supporting telegraph wires."

"Under one modification the standard consists of a cast or "wrought iron pillar and socket, the lower part of which is "formed with three radially projecting feathers extending from "the bottom up to the part which projects above the ground." "At the upper extremity of the pillar is fitted a cross head, "having two or other number of radially projecting arms, in "which are carried the insulators." Stays are carried down from lugs under the cross head to other lugs at the foot of the pillar.

"Another arrangement of the socket consists of a foot plate "made with radial arms, from which extend in an upward "diameter stays supporting a disc arranged a little above the

" surface of the earth. The telegraph pillar is passed down " through a suitable aperture in the disc, and stepped into the " foot plate, and the stays or guy rods are fastened to hooks pro- " jecting out from the periphery of the disc."

" Under another arrangement the main portion of the pillar is " cast of a hollow cylindrical figure, with equidistant longi- " tudinal ribs on the exterior. The lower part of the pillar is " cast of a suitable form to fit the socket, and with a laterally " projecting feather to prevent its turning round in the socket. " At that part of the pillar immediately above the surface of the " earth it is of a triangular or three-armed shape in its cross " section; these projecting parts sweep upwards and from the " longitudinal ribs, before referred to."

[Printed, 4d. No Drawings.]

A.D. 1862, November 13.—N° 3061.

RITCHIE, EDWARD SAMUEL.—" A new and useful invention " having reference to the mariners' compass."

This invention " consists in the combination of an auxiliary " annular air vessel or indicator and a connecting rod or me- " chanical equivalents therefor with the magnet or magnets, or " the same and its or their buoyant air vessel, the whole being " arranged within a case or vessel to contain water or other " proper fluid, and so as to operate together."

The other points constituting this invention are :—

" The combination of either or both of the buoyant air vessels " with their shaft by means of gimballs or their mechanical equi- " valents."

" The combination of an auxiliary buoyant chamber or its equi- " valent with the said connecting rod or connecter, the magnet, " or the same and its buoyant case, and the auxiliary case or in- " dicator, as arranged within a vessel or case containing a liquid, " and so as to operate therein."

" A peculiar arrangement of the cardinal divisions or indications, " with respect to the float or indicator when made either circular " or cylindrical in form, or as an annulus."

The Specification describes, and the Drawings show, an apparatus composed of an upper and a lower chamber connected together by a cylindrical tube. A shaft extends axially within this compound vessel or case and supports, in the upper chamber.

a buoyant compass card, and, in the lower chamber an indicator, or card having the cardinal points marked on its edge. The shaft is hollow, and is connected to the cards or buoyant air vessels by means of gimbals.

The magnetic portion of this apparatus may be placed at such an altitude above the deck as to be out of the reach of local magnetic influence.

[Printed, 8d. Drawing.]

A.D. 1862, November 13.—N° 3062.

DAVIES, George (*a communication from Alfred Henry Rémond*).—(*Provisional Protection only.*) "Improvements in preserving "provisions."

"In preserving cooked provisions in metal or other closed cases, "it has always been found extremely difficult to get rid of the "whole of the oxygen contained in the case, the smallest quantity "of which, if allowed to remain in the case would promote fer-"mentation and decay, and hence the provisions would become "deteriorated and totally unfit for food."

"Now, this invention consists in causing a current of electric "fluid to pass through the cases containing the provisions after "they are finally closed up, such electric fluid being made to pass "along a fine iron or other metallic wire through the case causes "the wire to become red hot and consume the oxygen.

"A further improvement consists in placing inside the case "(and in connection with the thin wire) any known chemical "agent (such as common sulphur, for instance), which in its "ordinary state has no particular affinity for oxygen, but which "upon becoming ignited (by means of the electric wire above "referred to) evolves any gas (sulphurous acid gas, for instance) "which will absorb, destroy, or convert into a harmless gas the "oxygen which is contained in the case, and which it is desired "to get rid of."

[Printed, 4d. No Drawings.]

A.D. 1862, November 15.—N° 3074.

CROC, Louis.—"An improved ink to be used for the purposes "of electric telegraphic printing or marking."

Colouring matters.—"All colors derived from aniline, which

"colors are three in number, red, violet, blue;" these colours are used "either separately or conjointly."

Dissolvents.—"All bodies pertaining to the alcoholic series; "the fixed or solid oils; the volatile or essential oils; glycerine."

Thickening matters.—"Resins, wax, & generally" "all substances which are suitable to unite with the above liquids to "render them thick or siccative."

"Dissolutions of aniline in the above-mentioned liquids yield "colored oils; these like all carburets of hydrogen, are instantly "absorbed by paper, which they penetrate, forming outlines of "perfect neatness."

The improved inks are used "either with Morse's apparatus or "the like, or with any printing type apparatus."

[Printed, 4d. No Drawings.]

A.D. 1862, November 18.—N° 3095.

BURNETT, William Hickling. — "Improvements in the "mode of working telegraphic lines and in instruments and "apparatus employed for telegraphic purposes."

1st. Preventing the evil effects of accidental currents.—Two telegraph lines are used in connection with instruments that have coils in opposite directions.

2nd. Obviating the retardation of signals.—Two wires are used in some cases, with or without extra batteries; in other instances one wire is used in connection with extra batteries, with or without resistance coils. In one arrangement, the synchronously moving wheels, described in N° 1271 (A.D. 1860), are used to make the requisite battery and earth connections.

3rd. In "sending the messages step by step at short intervals "from fresh batteries," preventing the change in the proportions of the signals as they are sent forward.—In one plan, "at each "alternate station, a short circuit is made or broken when the "signal is sent." In a second plan, the recall of the armature of the local electro-magnet is delayed by means of an adjustable coil.

4th. "The simultaneous working of two or even three distinct "systems of telegraph through one line wire."—Currents of different strengths are used, either all in one direction or in alternating directions. "Compensating electro-magnets" and "qualifying local currents" are used to prevent confusion and error.

5th. The arrangement of manipulating keys to carry out the 4th improvement.—The current sent depends upon the key or the combination of keys which is depressed.

6th. "Relay instruments."—The armatures may be recalled either by weak local currents, by a spring and local current, or by a permanent magnet and local current. Galvanometer needles are made to enter the axes of coils. A permanent magnet may be longitudinally attracted.

7th. A receiving instrument, worked by one clockwork, with several markers, is mentioned in the Provisional Specification only.

[Printed, 1s. 10d. Drawing.]

A.D. 1862, November 20.—N° 3119.

BROOMAN, Richard Archibald (*a communication from Joseph Corradi*).—(*Provisional Protection only.*) "A method of "and apparatus for indicating and recording the course of ships "and vessels."

"This invention consists in recording upon paper the actual "course run by a ship by the combined agency of photography "with natural or artificial light, the compass, and clockwork. The apparatus is called by the inventor a 'Loxodrograph.' In "the binnacle, under the compass, clockwork is fitted for the pur-"pose of unwinding paper sensitized in any manner followed in "sensitizing paper for the photographic process from a roll, "and of winding it on another roll. The rolls are placed on "opposite sides of the binnacle, and the paper is drawn horizon-"tally across and under the compass. A small object is placed "upon the disc of the compass, say, at the north pole, throwing "down or projecting a very intense luminous point upon the sen-"sitized paper. The effect produced is this, that if the ship pro-"ceeds, for example, in a straight line from north to south, the "luminous point will also trace on the paper a straight line from "north to south, and so on for all changes in the ship's course. "Should a ship be compelled to turn round, the luminous point "will trace an elliptical figure. The action is infallible, as the "paper turns with the ship, while the object remains stationary "under the influence of the north pole. The speed at which the "paper is made to travel being known, it becomes easy to ascertain "exactly how long a ship has run on such and such a tack."

[Printed, 4d. No Drawings.]

A.D. 1862, November 28.—N° 3189.

JOHNSON, John Henry (*a communication from Edmond Langlois*).—" An apparatus for indicating the pressure [presence ?] " of electric conductors in foreign bodies."

" This peculiar apparatus consists essentially of a hollow " sounding or testing rod, within which is placed so as to be free " to move to and fro another rod, which in all cases is insulated " completely from the outer tube or sounding rod. One pole of " a battery is connected with the outer tube, and the other pole " with the inner rod, and with either of these parts there is also " connected so as to be in the electric circuit a small electric " alarum bell or signal and galvanometer. The internal rod may " either remain fixed to the tube so that its lower extremity is " always flush with the end of the tube, or it may when not in " action be retained and held up away from the lower end of the " tube by means of a spring catch or other convenient contrivance. " If this apparatus be now inserted into a boring pushed into " sand, or submerged, the instant the extremity of the tube comes " in contact with or strikes a resisting body, the resistance occa- " sioned will effect the release of the inner rod and cause it to " descend until its extremity also comes in contact with the same " body; and if such body be metallic or conductive of electricity, " a circuit will be instantly established between the tube and " the inner rod through the contact therewith of the con- " ductive medium, and a current of electricity will pass through " the apparatus, ringing the bell, and indicating its pressure " [presence ?] on the galvanometer."

The Drawings show apparatus adapted to the discovery of metallic bodies under water, in gunshot wounds, in borings and in sand.

[Printed, 8*d*. Drawing.]

A.D. 1862, December 2.—N° 3237.

CAUTLEY, Richard Kingsman (*a communication from Mark House*).—(*Provisional Protection only.*) " Improvements in " electro-thermal baths."

The " bathing tub " contains " a non-conducting net basket or " tray suitable for containing the body of the patient." " Two " revolving metal frames, similar to crank axles, with their centre

" of motion in the centre of each end of the bathing tub, are " constructed and arranged to rotate freely in the space " between the sides of said tub and basket without interfer- " ing with one another." An insulated moveable "plate,' " conductor," or "pole," is fixed "on the outside of each of " these frames." "Upon the end of a short flexible conductor " extending from each of these poles a sponge is attached. By " rotating the frames, and changing the position of the moveable " plates on the frames and consequently the two poles, the cur- " rent of electricity may be readily controlled or passed in any " direction through the conducting medium. When either of the " poles are brought by the rotation of the frame above the water- " line the current will pass to the sponge, which can be readily " carried to the desired part of the body by the patient or attend- " ant. One end of the bottom of the net basket or tray is an " incline to support the head of the patient. Upon the under " side of this incline is hinged a metallic plate conductor, which is " constructed so that the same may be brought in contact with " the said incline, or removed therefrom in order to regulate the " degree of intensity of the electric current passing upon the head " and neck without changing the quantity. This plate is supplied " from the same generator as the poles."

[Printed, 4d. No Drawings.]

A.D. 1862, December 3.—N° 3240.

WILDE, Henry.—" Improvements in electro-magnetic tele- " graphs and in apparatus connected therewith."

1st. " Improvements in communicating motion to the arma- " ture axis of the magneto-electric transmitting instruments " described in N° 858 (A.D. 1861) and in N° 1994 (A.D. 1861).— " A worm wheel is keyed upon the axis which carries the radial " arm and index finger, and the worm which gears or takes into " it is fixed to the armature axis and revolves with it." To provide for the stoppage of the motion of the radial arm and of the armature shaft by the depression of a finger key, and for the motion being again communicated to the said arm and shaft when the finger key is allowed to resume its original position, certain cams act intermittently on an elastic ring surrounding the armature shaft; a pinion, fixed on to the armature shaft, gears into two pinions revolving on studs fixed in the face of the fly wheel, which

is loose on the armature shaft; the above-mentioned cams are fixed to the bosses of the pinions, and, in the normal position, the motion of the cam pinions is arrested by the pressure of the cams against the elastic ring; when the key is depressed, the fly wheel carries the cams over the ring.

2nd. "Suspending telegraph wires over houses and streets."—Several fine copper wires, twisted round a core of steel wire, constitute the conductor. These wires are supported by iron rods attached to chimneys by means of brackets. The insulators "are "threaded upon the iron rods one above the other." To each insulator is attached a thong of leather; the wires are attached to each end of the thong so that its tension is the same as that of the line wire. There is no tension on the short wires connecting the line wires across each thong.

[Printed, 8*d*. Drawing.]

A.D. 1862, December 8.—N° 3288.

SANDERSON, Charles.—"An improved mode of manu"facturing bands for driving machinery, lifting weights, and "other analogous purposes."

This invention consists in making the said bands "of thin sheet "steel or other metal cut to the width of the intended driving or "lifting band, and coated or protected in a peculiar manner by "india-rubber so as to preserve the metal from oxydation."

"The sheet steel or other metal cut to the proper width and "length, is first well cleaned on both sides by acids or otherwise, "in order to remove any oxide therefrom. It is then coated *by* "*the electro-plating process with brass*, after which the metal "band is covered with and entirely enclosed with a sheet of india-"rubber which is vulcanized thereon, when it will be found that "the rubber will have such an affinity for the brass covering that "it will adhere firmly thereto, and cannot easily be detached."

"Bands of great strength" "may be made by combining "together two, three, or more thin bands or strips of steel or "other metal, coated and covered in the manner above set forth, "interposing between all the metal surfaces a layer of vulcanized "india-rubber."

In adapting this invention "to the manufacture of bands of "greater length than can be made from one strip or length of

" steel or other metal, any number of lengths of sheet metal " (according to the total length of the band to be produced) may " combined and rivetted, or otherwise connected together in " such a manner as to break joint, and produce a band of equal " strength throughout."

[Printed, 6d. Drawing.]

A.D. 1862, December 8.—N° 3292.

HUGHES, Edward Thomas (*a communication from Johann Jacob Dahms and Albert Rudolph Wittig*).—" Improvements in " galvanic apparatus."

" This invention consists of various improved arrangements of " galvanic apparatus adapted to every part of the human body."

When this invention is applied to the head, a wig spring is employed. An element or galvanic pair of silvered copper and zinc is attached to each extremity of the said spring, so that the galvanic current from each element proceeds in the same direction " through the head." A shallow cavity is formed in the plates next to the head for the reception of moistened flannel. " At the " top of each cavity there are holes;" one for the supply of exciting fluid, the other for the escape of air; these holes are closed " when the cavity is filled."

In an apparatus " for passing a galvanic current through the " body from the foot to the wrist or other required parts," the two elements are joined by a wire, " of any suitable length, " and placed within an india-rubber tube." Silk ribbons are used to fasten the elements and the tube suitably about the body.

When a galvanic battery is " to be moistened when attached to " the body," it is placed within an India-rubber tube, " the ends " of which are closed air and water tight by plugs or bungs." The battery poles are passed through their respective plugs and connected to zinc and silvered copper plates respectively, which act as conductors, " there being an interrupter between the plate " and pile when interruptions of the galvanic current are re- " quired. In the plug at the positive end there is an opening " provided with a stopper, through which opening the tube may " be filled with acid and afterwards emptied."

[Printed, 10d. Drawing.]

A.D. 1862, December 12.—N° 3331.

HANCOCK, Charles, and SILVER, Stephen William.—"Certain compounds and substances applicable for electric insu-"lation, and other purposes."

This invention relates to the combination of caoutchouc with "ballata" "by mastication, rolling, or solution."

The compounds used for the above-mentioned purposes, of which there are several set forth, contain India-rubber, ballata, sulphur, vulcanized caoutchouc, colcotha, shellac, paraffine, resin, pitch, tar, marine glue, gum copal, gum mastic, or other gum insoluble in water, also gutta percha. Only certain of these ingredients occur in any one composition, according to the pur-ose for which it is intended. The compounds that can be vul-canized only contain India-rubber, ballata, and sulphur.

"For the insulation of electric conductors we wind round, coat, "or cover the conducting wires with strips of india-rubber in one "or more layers, and then consolidate the several laps by sub-"jecting them to the action of steam or heated vapour, we after-"wards apply a second coating of india-rubber and ballata, or "or ballata alone, or its compounds in a plastic state, and thus "make the joints and seams of the strips of india-rubber more "secure. In some cases we first insulate the wire with the "several plastic compounds, or some of them herein-before set "forth through dies, and afterwards lap or wind, or otherwise "apply tapes and fillets of caoutchouc upon such plastic com-"pounds."

"Ballata" is "the produce of a tree called sapota mulieri or "bullet tree, which is found in British Guiana and elsewhere."

[Printed, 4d. No Drawings.]

A.D. 1862, December 22.—N° 3411.

BAKEWELL, Frederick Collier.—"Improvements in trans-"mitting and receiving communications by means of electricity."

This invention consists of improvements on N° 12,352 (Old Law); the said former invention relates to electric "autographic" communications.

1st. "Facilitating the regulation of the instruments."—"A "single contact breaker at the central station," is "so connected "with sensitive electro-magnets called 'peckers,' or 'relays,' at

" every station as to make and break contact at regular short " intervals, and in this manner local voltaic batteries may be " brought into action, and all the telegraph instruments be regu- " lated to move synchronously at one uniform rate of speed."

2nd. "Rendering the writing more distinct."—A small local electro-magnet reverses " the action of the electricity on passing " through the message transmitted, so that the style on the re- " ceiving instrument may mark the paper when the style of " the transmitting instrument passes over the varnish, and not " when it rests upon the metal."

3rd. " Diminishing the effect of induction in submarine and " underground wires."—A "pecker" is "so arranged as to re- " verse the direction of the electric current or turn it to the earth " as the style passes over each letter." The Drawing shows a local electro-magnet, the armature of which carries two contact pieces, insulated from the armature and from each other; four stops and a reaction spring are used in this arrangement.

4th. "The use of frosted tinfoil, whereon to write the messages " to be transmitted."—This surface "receives the ink readily, and " common writing ink, thickened with gum may be used instead " of varnish."

[Printed, 6d. Drawing.]

A.D. 1862, December 24.—N° 3434.

GISBORNE, FREDERIC NEWTON.—(*Provisional Protection only.*) The title of this invention is " Improvements in the means " for indicating the speed of ships at sea."

The inventor states:—" I employ magneto-electric currents ex- " cited by a soft iron armature revolving before electro-magnets " attached to a permanent magnet, and motion is given to the " armature by the action of the water upon screw fans attached " to a shaft, at the end of which the armature is secured, in " accordance with the speed at which the apparatus is towed " through the water. The currents generated are conveyed " through insulated wires to a step-by-step electro-magnetic in- " dicator, and the number of progressive movements within a " given time will thus indicate the vessel's speed, and sometimes " I use the revolving axis simply to make and break a galvanic " current which in effect answers the purpose herein-before men- " tioned."

[Printed, 4d. No Drawings.]

A.D. 1862, December 26.—N° 3453.

VARLEY, CROMWELL FLEETWOOD.—"Improvements in electric "telegraphs."

The object of this invention "is to obtain a high speed of "transmission through long circuits."

1st. "Employing for electro-telegraphy the increment and de- "creement of electric currents instead of, as has heretofore been "the case, the flow of the current itself."

In one mode of carrying out this part of the invention, induction plates are inserted into the line-wire circuit "at the receiving "end of the cable;" a second circuit from the cable to the earth, independent of the receiving instrument and induction plates, is formed by means of a resistance coil with a large iron core.

A second mode consists in substituting for the telegraph instrument in the last plan "an electroscope and connecting its two "poles by a resistance coil."

In a third mode an "electro-magnet requiring a long time to "magnetize," is used; it "is wrapped with two wires, one acting "as a primary, and connected between the cable and the earth, "the other acting as a secondary is attached to the telegraph in- "strument."

By a fourth mode "the instrument coils are wound with two "wires, and the cable current is made to circulate in opposite "directions through them, the current from the one wire goes to "the earth through resistance coils, the other part of the current "goes to the earth through the coil of an electro-magnet of large "dimensions."

According to a fifth mode the currents go round two galvanometers, one having a light needle the other a heavy one; the electric contacts established by the difference of motion of the said needles complete a local circuit, which works the receiving instrument.

A sixth mode (noticed in the Provisional Specification) consists in using two electro-magnets of different dimensions.

For working long submarine lines, certain arrangements of induction plates, with or without resistance coils or induction coils, at the transmitting end, are described and shown.

2nd. Employing a "test circuit formed by induction plates and

" resistance coils, so adjusted to each other as to produce an " artificial line possessing the same amount of retardation as the " cable itself."

3rd. In relays and other telegraphic instruments, contact springs are provided, at the points of contact, with " little beads " of platinium."

The following Letters Patent are referred to:—Nos 371 (A.D. 1854), 2555 (A.D. 1856), 3059 (A.D. 1856), and 206 (A.D. 1860).

[Printed, 1s. Drawing.]

A.D. 1862, December 26.—N° 3454.

LOSEBY, Edward Thomas.—" Improvements in the construc- " tion of instruments for ascertaining the pressure and the moving " force of the atmosphere."

1st. " Instruments for measuring the barometrical pressure of " the atmosphere and other gaseous bodies or vapours, the object " being thereby to obtain greater accuracy and longer ranges in a " smaller and more portable instrument than the aneroid and the " like now used for that purpose."

2nd. " Instruments for measuring the force of horizontal, ver- " tical, or oblique motions of air or other gaseous bodies from " gentle currents to strong gales."

" One form of this improvement consists of a disc fixed on the " end of a lever moving on a pivoted axis, and having a weight on " the opposite side to counterpoise the disc and lever." " The " works are contained in a suitable case for protecting them from " injury, which is small enough to be conveniently carried in the " pocket. A rim on the case excludes the wind from the edge of " the disc when it is desired to ascertain the force in one direction " apart from another. The case contains *a magnetic compass* " connected with it by a joint, which allows the instrument to be " set at any angle with the horizon for ascertaining the down- " ward or upward direction of the wind, and an index is provided " for reading off the inclination, whilst the compass shews the " magnetic direction."

In another arrangement the wind blows upon a ball. " The " works are contained in a suitable case, and may be conveniently " carried in the pocket after the air has been expelled from the

"ball." "*A magnetic compass* is attached to shew the direction "of the wind."

[Printed, 4*d*. No Drawings.]

A.D. 1862, December 30.—N° 3479.

CLARK, WILLIAM (*a communication from Léon Foucault*).— "Improvements in governing apparatus."

This invention may be applied "in clockwork, *telegraphy*, and "chronography."

A Watt's governor is connected through certain levers with a weight, in such a manner that "the apparatus will revolve at a "speed which instead of accelerating on the expansion of the "balls, as in Watt's governor," will always be maintained at the same rate of speed for all variations of the angle that the rod carrying the governor balls makes with the vertical line.

"When Watt's governor has once been modified as above "stated it constitutes a very exact indicator of the least variation "of power acting thereon." In order that this modification may serve as the regulator of a machine it suffices to connect the lever arm which bears the weight above mentioned, "with parts "repressive of the power or resistance."

In "wheel mechanism with continuous motion and constant "speed for astronomical and chronographic purposes," it is necessary to apply an auxiliary resistance" that is "always ready "to take up the excess of motive power." A rotary fan apparatus, suited to this purpose and that will not cause any reaction "which might disturb the isochronism of the regulating apparatus," consists of a fan wheel enclosed in a cylindrical case which is furnished with the same number of apertures as the jacket in which it is enclosed; a lever from the "governor" opens or closes the apertures by acting upon the jacket of the fan wheel.

The influence of passive resistances is eliminated by giving an undulating form "to the surface, by which relation is established "between the governor and the machinery from which it derives "its isochronism."

The mathematical principles of this invention are set forth in detail.

[Printed, 1*s*. 4*d*. Drawings.]

1863.

A.D. 1863, January 2.—N° 18.

MUNTZ, WILLIAM HENRY.—" An improved method of at-
" taching sheathing to iron or other vessels."

This invention consists " in attaching the sheets of india-" rubber or other insulating or 'anti-galvanic' material to the " vessel's side and the metal sheathing to the insulating material, " by means of marine glue or such other cement or adhesive " material as will resist the action of sea water, instead of nailing " or rivetting the same as previously practised or proposed."

The Provisional Specification states that the waterproof glue can be used to attach the sheathing to iron vessels without the intervention of other insulating material. In the Final Specification this part of the invention is confined to wooden vessels.

The waterproof glue may be used for attaching the insulating material to the sheathing as well as to the ship's side. According to another plan the India-rubber may be attached "to the metal " sheathing by heat and pressure only during the process of vul-" canization," and the waterproof glue may be used *only for* attaching the India-rubber to the ship's side.

[This Specification is included amongst the electric series of inventions, as the prevention of electric contact between the sheathing and the iron of the vessel (both being in sea water) is a practical application of electric science.]

[Printed, 4*d*. No Drawings.]

A.D. 1863, January 3.—N° 30.

NEWTON, WILLIAM EDWARD (*a communication from George Washington Beardslee and Frederick Edwards Beardslee*).—" An " improved method of firing or discharging cannon and other " fire-arms, a part of which invention is applicable generally to " the firing of charges of powder."

1st. " The firing of cannon and other fire-arms by means of " currents of electricity, and without the use of a vent or touch-" hole."—A conical hole is formed in the breech of the cannon " and in line with the axis of the bore," " with the greater

"diameter inside;" to this hole is accurately fitted an enamelled conical plug of metal. "The metallic surface of the inner end "of the plug, or at least a portion of it, should be left uncovered" to make electric contact with one of the fuse wires.

2nd. "The fuse by which a charge of powder, wherever "desired, may be fired by means of a current of electricity."—Two copper wires are inserted into a block of wood, which may be termed "the holder;" the edges of the extreme ends of the "wires should be completely in contact with the wooden holder." "The other ends of the wires are left to project from the block "to a sufficient length for a purpose to be presently described." The extreme ends of the two copper wires are connected by a mark "made with a pencil of the softest and purest plumbago." A small case containing a small charge of powder is in contact with the plumbago line. When one pole of a magneto-electric machine is in contact with the bore of the gun and the other with the conical plug, the electric current traverses the fuse wire that projects from the centre of the cartridge, ignites the powder in contact with the plumbago, and completes the circuit through the fuse wire in contact with the bore.

[Printed, 6d. Drawing.]

A.D. 1863, January 5.—N° 31.

KEELING, Enoch Bassett.—"An improvement in lighting "halls, theatres, and other buildings."

This invention "relates to the diffusion of intense light and to "the prevention of shadows."

"I take an *electric light*, a lime light, or other source of intense "light, and place it in some elevated spot above the space to be "lighted. Under or before, or part under and part before, this "light I suspend or fit a plain white, tinted, or colored curtain or "screen, and again, in some instances I place under or before, "or part under and part before, a ceiling of glass or other "transparent medium. By these means I remove the obstacles "that have hitherto prevented the successful application of the "electric, lime, or other intense lights to the lighting of the "interiors of large rooms and public edifices."

The curtain or screen may be suspended across the chamber "by rings or cords, or in any other most suitable manner." The

said curtain is, by preference, of oiled silk, and of a light pink tint.

"The ceiling of the hall below the chamber I construct in the "ordinary manner of a ceiling, light, and of figured or ground "glass. The intense rays of the light are" "diffused in passing "through the curtain or screen, and the hall is pleasantly and "effectually illuminated, and devoid of deep shadows."

In some cases two or more chambers are placed above the ceiling, "each with its own light or lights and curtains or screens "arranged as before specified." The chamber may, in certain instances, be constructed "below the ceiling in the form of an "inverted dome," in the centre, or at one or both ends, or at each angle of the apartment.

[Printed, 4d. No Drawings.]

A.D. 1863, January 5.—N° 34.

HOWARD, John, and BULLOUGH, John.—"Improvements "in warping or beaming machines."

"This invention relates to self-acting stopping motions for stop-"ping the warping or beaming machine when one or more of "the warp threads break, or when a bobbin is empty," and consists of various improvements upon N° 1948 (A.D. 1862).

1st. "Making the pin holder capable of expanding and con-"tracting by forming it of one or more bands of vulcanized "india-rubber or metal springs."

2nd. "Certain improvements connected with the electrical "apparatus."—Each pin, in the shape of a double lever, is hinged on a shaft which is connected to one battery pole, and the bar which forms the other battery pole is placed under the ends of the said levers. The threads support the levers, but, upon the breaking of a thread, its lever completes the electric circuit. To ensure electric contact of a fallen pin, the conducting bars are moved either reciprocally or in a rotary manner.

3rd. "Improved modes of working a revolving fan."

4th. "Giving the oscillating bar two working strokes in one "revolution of the eccentric."

5th. "The employment of a self-acting cleaner or fluker."

6th. "Giving a drag to the thread and preventing the weight "of the pins pulling any slack between the rollers and bobbins."

7th. "Arresting for a short time the descent of the swing or "take-up roller for the purpose of causing the yarn to be sufficiently slack for all the pins to fall, and thereby enable them to "clear their sheaths, guides, or slots of fluke or other matter."

8th. "An improved mode of driving the machine by friction "pulleys."

[Printed, 3s. Drawings.]

A.D. 1863, January 6.—N° 41.

NEWTON, WILLIAM EDWARD (*a communication from George Washington Beardslee*).—"Improvements in magneto-electric tele-"graphs."

In this invention the same movement which works the magneto-electric machine designates the signal to be transmitted.

The magneto-electric machine described in N° 1647 (A.D. 1859) is rotated by a handle on the signal instrument, the said handle being connected with the axis of the magneto-electric machine by suitable wheelwork. The signal instrument consists of two electro-magnets having a pendulous permanent magnet or armature between their poles; a "forked arm" or pallet at the upper extremity of the pendulous armature rotates the dial hand of the signal instrument.

When a message is transmitted by this apparatus, the rotation of the handle works the magneto-electric machine, and the alternately positive and negative currents from the machine operate the dial hand of the signal instruments at the transmitting and receiving stations.

When a message is to be received, a "switch" excludes the magneto-electric machine at the receiving station from the telegraphic circuit.

Instead of connecting the wires of the magneto-electric machine "from spool to spool," they may be connected with a "keyboard," by means of which the amount "of intensity or volume" of the electricity developed may be adjusted to the circuit.

Instead of being connected with the above-described indicating apparatus, the "pendulous magnet" may be connected with a Morse marking instrument, or with a printing arrangement.

[Printed, 1s. 6d. Drawings.]

A.D. 1863, January 12.—N° 93.

CHATTAWAY, EDWIN DANIEL.—(*Provisional Protection only.*)
"Improvements in railway signals."

"This invention relates to improvements in railway signals, "and consists, firstly, in adapting the cord and bell or cord and "whistle arrangement or signal at present in use for enabling "the guard of a train to communicate with the engine driver so "as at the will of the guard to convert such arrangement into an "electro-galvanic or electro-magnetic signal. This I propose to "effect by enclosing copper or other suitable wire or wires pro-"perly insulated in the cord of the arrangement before referred to, "and connecting the same with a galvanic battery or magnetic "apparatus in the guard's van.

"Secondly, in constructing railway semaphore and other simi-"lar signals of sheet iron, either coated or not coated with vitreous "enamel or other similar material."

[Printed, 4*d*. No Drawings.]

A.D. 1863, January 13.—N° 101.

FENBY, JOSEPH BEVERLEY.—"A new or improved instrument "or apparatus to be attached to pianofortes, organs, and other "similar keyed musical instruments, for printing the score of "any music performed on the said instruments."

The Specification describes the application of this invention to a pianoforte. "From side to side of the keyboard" two uninterrupted "electric bridges" are formed; the said "bridges" or short circuits are "capable of being broken in any one or more "places by using the keys of the instrument as in playing." To each key there is an electro-magnet and marking point, and the depression of any one key removes the short circuit from its electro-magnet, thus enabling its marking point (in connection with the armature) to impress travelling paper at the place corresponding to the note struck; the length of the mark upon the paper is proportional to the duration of the corresponding note.

To impress accidental sharps, flats, and naturals, a shuttle "is "made to play rapidly backwards and forwards" across the paper; the said shuttle carries the requisite type, and the proper type is brought into action by means of a special electro-magnet.

"To indicate when the notes printed should be read an octave "higher or lower" a separate electro-magnet is connected with the group of keys at either end.

To stop out flats, sharps, and naturals, except where accidental, pinned rollers "are rotated by means of a magnet, the contact "of which magnet" is made and broken by means of a spring pressing on an ivory disc with metal studs.

The motive power employed to work the travelling paper and the shuttle, "may be derived from an electro-magnetic engine."

[Printed, 1*s*. 2*d*. Drawings.]

A.D. 1863, January 13.—N° 104.

PLATTS, William, and BAILEY, John.—(*Provisional Protection only.*) "Certain improvements in telegraphic cables."

"The invention relates to a novel method of protecting the "wires employed in telegraphic communication, whereby the strain "of any great length of cable is sustained by the covering or pro-"tection, instead of partially by the wire as hitherto, and thus the "continuity of the wire is preserved.

"The improvements consist in surrounding or enclosing the "wires in a metallic tube or case formed in short lengths, every "alternate length being formed like a ball at each end, the inter-"mediate lengths being formed like a cup or socket which are "to enclose the balls, and all these lengths are to be made in "halves (in the direction of their length) and bolted together "or otherwise secured at their edges, so that when they are so "secured together with the balls in the sockets to form the joints, "they will constitute a flexible tube enclosing the wires, which "will not gradually elongate by strain as the twisted wire cover-"ing now employed."

[Printed, 4*d*. No Drawings.]

A.D. 1863, January 19.—N° 160.

BROOKE, Sir William O'Shaughnessy.—(*Letters Patent void for want of Final Specification.*) "Improvements in the "manufacture of insulators for electric telegraphs."

The inventor substitutes for the ebonite cell mentioned in N° 1800 (A.D. 1861) "a cell of hard and unvarnished papier "maché of the same shape as the ebonite cell, but thicker, so as

" to fit with strong friction into the iron cap, and to receive the " iron pin also with strong friction. The several pieces are put " together by lever pressure, the external cap being warmed so " as to contract on cooling round the papier maché cell. The " papier maché is thoroughly saturated with pure paraffine by " being placed in a bath of this substance melted in a vacuum " apparatus, by which all air is exhausted from the pores of the " papier maché, and the liquid paraffine then forced in under a " pressure of 100 lbs. or more to the inch." The inventor also employs " plates of talc or layers of asbestos fibre within the iron " cap, and between this and the papier maché cell, and also within " this cell and between its internal surfaces and the central iron " pin; but the papier maché impregnated with solid paraffine " may be used with or without the talc or asbestos fibre, and with " any ordinary cement in common use, such as sulphur or melted " rosin, sand and oil, as at present employed on the Indian " lines."

[Printed, 4*d*. No Drawings.]

A.D. 1863, January 19.—N° 163.

HARRISON, William Henry.—(*Provisional Protection only.*)

" Improvements in covering wire and other iron articles for the " purpose of protecting them from oxidation, and in the mode or " method employed therein."

This invention is " more especially adapted to the protection " of electro-telegraphic wires and iron wires composing submarine " telegraph cables."

The invention consists " in immersing the object to be pro- " tected, first, in a bath of metallic alloy in which lead is present, " but of which tin or zinc forms a large proportion, then after " the object has been so coated treating it mechanically, by " drawing, rolling, or burnishing, and afterwards immersing the " object so coated and treated in a second bath of suitable alloy, " composed entirely or nearly entirely of lead tempered or regu- " lated in its degree of metallic hardness by the addition of " bismuth or other suitable metal, when the article may again be " submitted to mechanical treatment as before. The two opera- " tions of coating, and the mechanical treatment may be a " continuous process, as the one bath may be in advance of the " other, and the cone, die or other mechanical apparatus may be

" interposed between the two baths." " In every case the first " bath must contain a sufficient proportion of lead to insure an " affinity between the surface of the first coating and the metallic " contents of the second bath, and thus the degree of hardness is " made to vary from the centre to the outer surface of the second " coating, and this in the case of iron wire enables it to be bent, " twisted or knotted without displacing the metallic coatings, as " is usually the case with iron wires coated with zinc or tin, owing " to the imperfect adhesion and similarity of density or hardness " which does not permit of the coating accommodating itself to " the alteration of form."

[Printed, 4d. No Drawings.]

A.D. 1863, January 20.—N° 171.

BONNEVILLE, Henri Adrien (*a communication from Claude Joseph Thirault*).—" Improvements in coloring, bronzing, and " preserving iron and steel."

The principal points connected with this invention are:—

1st. " The creation at the surface of the iron or steel of an " adherent coat of peroxyde of iron."

2nd. " The transformation under the influence of water at an " elevated temperature of the peroxyde of iron into black oxyde, " which is less oxydised."

3rd. " The renewing of the operation until this black coat is " thick and adherent enough."

4th. " The immersion of the articles in a bath of luke-warm " water, for the purpose of removing the acidulated or saline par- " ticles adhering to their surfaces, and allow of their being " greased with olive oil."

" Ornamentations *in metal deposed by the electric battery* should " only be made after the total coloration of the articles. In this " case, after the coloration of the metal, the parts which are not " to be gilt, silvered, or otherwise covered by metallic coatings, " are protected by varnish, which may be removed when the " operation is finished. Objects destined to be placed in exposed " situations should be covered with a slight coating of copal " varnish. This varnish (laid on in the ordinary way), produces a " fine brilliancy on the surfaces to which it is applied."

Various solutions for peroxidizing the iron or steel surfaces, and many details of manipulation are set forth.

[Printed, 4d. No Drawings.]

A.D. 1863, January 21.—N° 180.

BUSCH, Frederic Augustus.—(*Provisional Protection only.*) "Improvements in the manufacture of metallic vessels or receptacles for containing liquids or substances."

"This invention consists in a new method of manufacturing metallic vessels or receptacles of whatever form suitable for containing various liquids and substances, and especially adapted for use by chemists and druggists. I propose to form the vessels, whether in the form of bottles, jars, or otherwise, of a base metal such as iron, and to immerse them in a bath or solution of a noble metal, such as platinum, silver, or gold, bringing the poles of a galvanic battery to bear upon the articles and upon plates of the desired noble metal, whereby the plates will become dissolved, and the metal deposited on the interior and exterior surface of the base metal, thus producing a surface capable of withstanding oxydation and the effects of acid, salts, or solutions. In some cases I propose to line or coat the vessels with a noble metal in the form of foil or thin sheets, whereby a similar advantage will result.

"By this invention not only may metallic vessels be used by chemists and others in lieu of glass, but carboys may be made of metal capable of withstanding the effects of sulphuric and nitric acids without the danger of breakage at present so liable to occur by the use of glass."

[Printed, 4*d*. No Drawings.]

A.D. 1863, January 23.—N° 210.

GISBORNE, Frederic Newton.—"Improvements in the means of communicating signals on board ship, and of indicating the position of the rudder."

A box has on its face divisions corresponding to the signals to be conveyed to the helmsman, "and in front of such divisions there are knobs." The pressure of a knob completes an electric circuit "through one or other of the electro-magnets" in another similar box in front of the helmsman; the excited electro-magnet then acts on its armature, to which is attached a shutter covering the sign. The armature "being pivotted to move excentrically," raises the shutter. An electro-magnetic bell in circuit calls attention "to each order transmitted," and the helmsman, by pressure

against a lever, "completes the electric circuit through the parti-
"cular flap which has been raised, and through electro-magnets
"in the instruments used by the officer," "and thus acknow-
"ledges the orders sent."

The position of the rudder is indicated by means of a rod connecting the rudder head to a wheel which revolves upon a metal segment. Each section of the segment is "in electric "circuit with one or other of the electro-magnets," and "the "actual position of the rudder is indicated by the lifting of a "flap or shutter upon the officer's instrument independently of "the helmsman. The instruments are connected with an electric "cable."

"Similar arrangements may be employed for engine room "signals."

A pointer may be used instead of knobs to transmit the signals.

A battery of platinized silver and amalgamated zinc is employed in connection with a glass cell and gutta percha covers.

[Printed, 1s. 4d. Drawings.]

A.D. 1863, January 23.—N° 211.

CLARK, WILLIAM (*a communication from Georges Fabre*).—(*Provisional Protection only.*) "Improvements in mariners' com- "passes."

Two rectangular electric circuits are balanced on a pivot, one circuit being on each side of a double "cross piece" which is free to vibrate horizontally on the said pivot. The requisite electric circuits are completed by means of mercury cups suitably placed on a rod.

When the instrument is used as a "compensator," the current is passed through both circuits in the same direction; "the appa- "ratus will then take a position E. and W., which line will be so "much more in a magnetic E. and W. line, and the compensation "be more perfect according as the magnetic source of deviation "is more or less in a plane perpendicular to that of the instru- "ment."

"In order to use the instrument for measuring the deviation "which exists when the compensation is not perfect, I first use it "as a compensator, taking note of the direction of the instrument, "and then work first the right-hand circuit and then the left one, "and so obtain, by means of the previous direction of the instru-

" ment, two angles, which on comparison gives the correction " necessary to be applied to the instrument, and so permit of again " finding a true magnetic bearing E. and W. In order to find " the direction of the magnetism which influences the compass, I " divide the angle of the side presenting the widest deviation pro- " portionately with regard to the two angles."

[Printed, 6*d*. Drawing.]

A.D. 1863, January 27.—N° 233.

DAVIES, George (*a communication from Alfred Henry Rémond*).—(*Provisional Protection only.*) " Improvements in " preserving provisions and in the apparatus employed for such " purpose."

1st. " Causing a current of electric fluid to pass through the " cases containing the provisions after they are finally closed up, " such electric fluid being made to pass along a fine iron or other " metallic wire through the case causes the wire to become red " hot and consume the oxygen."

2nd. " Placing inside the case (and in connection with the thin " wire) any known chemical agent (such as common sulphur for " instance), which in its ordinary state has no particular affinity " for oxygen, but which upon becoming ignited (by means of the " electric wire above referred to) evolves any gas (sulphurous " acid gas, for instance,) which will absorb, destroy, or convert " into a harmless gas the oxygen which is contained in the case, " and which it is desired to get rid of; or the sulphur or other " agent may be ignited by any other convenient means."

3rd. " After the case has been closed a sufficient quantity of " hydrogen gas is to be introduced therein to form (with the " oxygen which may be in the case) an explosive mixture or gas, " and this gas is to be then ignited by passing a current of elec- " tricity along a metallic wire through the same, and thus all " traces of oxygen will be destroyed."

4th. " Placing the meat in the cases after a short par-boiling " in very fast boiling water;" the case is then "cooled to diminish " the pressure inside," and " filled entirely with boiling water;" the case is then closed and " immersed in the hot bath for about " an hour, more or less, according to the size of the case. The " process is then completed."

[Printed, 4*d*. No Drawings.]

A.D. 1863, January 27.—N° 241.

HUGHES, DAVID EDWARD.—" Improvements in means or " apparatus for effecting telegraphic communications."

1st. Regulating or governing the motion of recording apparatus by means of " an elastic and weighted rod capable of vibrating in " a rotary direction when acted upon by an arm " from the fly-wheel axis of the instrument; the said weighted rod is applied opposite the end of the said axis, " but held somewhat inclined " to it."

2nd. In recording telegraphs, facilitating the change from letters to figures.—The different symbols are placed on the periphery of the type wheel in alternate order. The hollow shaft to which the type wheel is affixed, also carries, loose upon it, an adjusting wheel. By means of a lever and tappet arrangement set in action by certain electric currents, the teeth of the adjusting wheel are made concident with one or the other set of signs on the type wheel, the adjusting wheel having teeth which correspond only to one set of signs on the type wheel.

3rd. When using a permanent magnet in connection with an electro-magnet, as described in N° 2058 (A.D. 1855), and N° 938 (A.D. 1858), connecting the armature through a small local battery to one wire of the electro-magnet, and the other wire with a stud that is acted upon when the armature is raised. When the electro-magnet is excited, the line-wire current is instantly diverted from the coils of the electro-magnet to the local battery circuit.

4th. Improvements in certain levers of the character referred to in N° 938 (A.D. 1858).—Instead of extending over only two contact pins, the surface of the said levers is " adapted to be in contact with any one of the pins " " a period equal to the time of " traversing the space occupied by four of such pins."

[Printed, 1s. 8d. Drawings.]

A.D. 1863, January 31.—N° 287.

GROSSMITH, JOHN.—(*Provisional Protection only.*) " An " improved mode of producing the aura-electric gas."

The principal features of the invention are :—

" The application of a new radiator by acting upon a solid, and " of the use of a radiating multiplied network forming shelves,

" by which I present more surface for the air to act upon the vola-
" tile liquid. I use multiplied wire network for every one of the
" shelves, by which I present both top and bottom surfaces for
" radiation."

" The use of asbestos as my defuser of the volatile liquid, by
" which I again present surface at all angles of my cylinder."

" No heat or fire whatever" is used to generate the gas.

" I use no tubes nor cotton, nor any capilary action, nor any
" vertical arrangement of tubes; I rely upon atmospheric and
" galvano-electric action, and use the positive force of the oxygen
" by atmospheric pressure, change the polarity of nitrogen from
" the negative to the positive, sending into my cylinder positive
" together with the oxygen, leaving the negative law to work in
" combustion outside in harmony with the hydrogen uninterfered
" with by version of polarity and the physical laws of atmospheric
" pressure without."

" The use of zinc and copper, platinum, gold, and silver wires,
" by which I promote electric activity."

[Printed, 4*d*. No Drawings.]

A.D. 1863, February 4.—No. 313.

HASELTINE, George (*a communication from William Brainerd Barnard*).—" Improvements in the mode of uniting metallic sur-
" faces."

1st. " Securely joining thin metallic sheathing to iron plates
" by means of simple rivets."

2nd. " Preventing galvanic action between the sheathing and
" plates by the introduction of india-rubber or gutta percha
" between the sheathing and said plates."

" When by means of my invention the hulls of iron vessels are
" to be protected with a sheathing of copper, if the copper be
" placed in immediate contact with the iron a powerful and
" injurious galvanic action will ensue whenever the least moisture
" is created between the opposing surfaces. In order to prevent
" this voltaic action of the copper and iron, and to avoid entirely
" its evil effects, I introduce a thin layer of india-rubber or
" gutta percha between the metals."

This portion of the invention is further defined to be " the use
" of a thin layer of india-rubber, gutta percha, or other insulating
" substance or material when interposed and combined with the

"outer copper facing and the iron surface beneath, the same "being rivetted and secured, substantially as herein set forth."

Wooden strips may be inserted between iron strips, against the iron surface of the vessel, to ensure a "flush" surface to which to "rivet" the copper facing.

[This Specification is included in the present series of Abridgments because it especially mentions the prevention of "galvanic "action."]

[Printed, 6d. Drawing.]

A.D. 1863, February 13.—N° 396.

WHITAKER, SAMUEL.—"Improvements in indicating the "positions or conditions of railway signals and points, and in the "apparatus employed therein."

In working "the day and night signals on a line of railway" according to this invention, the electric circuit of a galvanic battery at the signal post is made to include contact apparatus connected with the signal rod, and an indicator or galvanometer at the signalman's box; by this means it can always be known whether the signal is "on," "off," or "wrong." By means of an "electric switch" the current can be turned into another circuit whenever it may be necessary to ascertain whether the lamp is burning or not; this second circuit, besides the galvanometer, includes a pyrometer or bent piece of metal, having an insulated contact piece on one extremity, which completes the electric circuit when the said pyrometer is heated by the lamp flame and not otherwise. The contact apparatus at the signal rod consists of a spring, connected therewith but insulated thereform, which moves over three insulated metallic plates, the spring and extreme metallic plates being suitably connected with the battery and line wire. In the "electric switch," a moveable metal stop may connect two out of three insulated metallic plates.

In applying this invention to the "points or switches in the "line of rails," contact apparatus worked by the switch levers, and the indicator, are included in the circuit of a galvanic battery placed at the "points." The contact apparatus consists of an insulated arm on the switch rod, which makes contact with one of two metal plates, or with neither, according to the position of the "points."

The direction of the electric current shows whether the signal

or switch is "on" or "off;" at an intermediate position of either. no electric current passes.

[Printed, 10d. Drawing.]

A.D. 1863, February 14.—N° 401.

GISBORNE, John Sacheverell, and SIMPSON, William.—" Improvements in means for rendering ships' and other " compasses insensible to local attraction."

This invention consists of " the use or employment of elec- " tricity " for the above-mentioned purpose.

" A current of electricity " is passed " from an ordinary bat- " tery through a coil of insulated copper wire wound around a " hollow conical or semispheroidal compass box, or wound around " a hollow conical or semispheroidal shaped dish encircling the " compass box. In either of these arrangements the magnetic " or compass needle rests on a centre pin, or when there are " more than one they are secured to the card or other part, which " rests on the pin in any usual way, at a short distance below " a straight line drawn horizontally across the upper termination " of the said coil and below the mouth or termination of the " conical or semispheroidal shaped box or dish, the leading fea- " tures of construction of compasses at present in use being " retained."

The electric currents " should pass around the cone, and con- " sequently horizontally around and below the magnetic or " compass needle or needles in opposite directions, that is, the " layer of insulated wire next the cone may have the electricity " passing in one direction whilst the layer over it may have the " electricity passing in the opposite direction, or two insulated " wires with the positive end of one and negative end of the " other laid together may be taken and wound around the cone."

The effect of this arrangement " is to counteract practically " all local attraction of the magnetic needle or magnetic needles " in ships' and other compasses and give ' a true north pole.' "

[Printed, 10d. Drawing.]

A.D. 1863, February 17.—N° 437.

TASSIN, Desiré.—" Improvements in preventing the explosion " of steam boilers."

"It is known that explosions usually occur when the steam "engines are at rest, and when the steam may be said to be at a "mean pressure in the boilers, that is to say, when the stone "float can sway or move freely at the least bubbling of the water. "Now it should be stated that I have ascertained that it is elec- "tricity which causes the explosions of steam boilers. The stone "float of a steam boiler has through its centre an iron clasp, "suspended on a copper wire. When the water contained in a "boiler happens to be more or less impregnated with acid or "alkali, the least movement which takes place in the float causes "a shock or friction between the two different metals (iron and "copper) that are in contact, and the electric spark is produced "at their point of junction, and thence comes the explosion. "My invention consists in preventing these electric sparks, and "consequently the explosions of steam boilers by electricity, in "the following manner:—In place of employing two metals to "the stone float, I only use one metal, both for the clasp and "for the suspending of the float, for which reason the clasp as "well as the wire which suspends or sustains the stone float I "make of copper; by thus using only one metal the same will "not be capable of emitting electric sparks under the circum- "stances above mentioned, and electric explosions will be thus "prevented."

[Printed, 6*d*. Drawing.]

A.D. 1863, February 20.—N° 464.

SIEMENS, Charles William.—"Improvements in insulating "and supporting telegraph line wires."

1st. "The employment of the juice or milk of the india-rubber "and gutta percha trees, and varieties of the same for coating "electric telegraph line wires or cables."

2nd. "Effecting one or more coats of india-rubber or gutta "percha, either alternately or combined, upon electric telegraph "line wires by passing the wire to be so coated successively "through a bath containing the juice or juices of the india-rubber "and gutta percha trees, and a shaft containing heated air or gases, "to consolidate or indurate the covering; also the combination "of such successive coats with layers or coats of insulating "material applied in any known manner."

3rd. The juice of the India-rubber or gutta percha trees is applied to saturate the fibrous material used in forming insulated telegraph line wire. The core, spun round with hemp, is passed into a bath of the juice, and a second layer of hemp is spun "in "the reverse direction before the juice has become consolidated." According to another method, a stream of the juice is passed upon the wire before the second covering is applied.

4th. Constructing telegraph posts "of a foundation plate of "cast or wrought iron," "to which is attached" "a pipe or "socket of cast or wrought iron, rising to some height above the "ground, and receiving in its upper end a conical or cylindrical "welded wrought iron tube cemented into the same, and carrying "the insulating supports for the line wires."

5th. "Insulating supports" for the line wires.—An inverted bell of non-conducting material is cemented into an inverted cast-iron cup. An enamelled iron stalk, to carry the line wire, is cemented into the bell. The cup, or a pair of them, is connected, by means of an arm, with a socket that slips over the post. A flange and strap may be used instead of a socket.

No. 59 (A.D. 1862) is referred to in this Specification.

[Printed, 1s. Drawing.]

A.D. 1863, February 21.—N° 476.

DODWELL, Robert Valentine.—(*Provisional Protection only.*) "An improved method of preventing the destruction of "plants by insects and certain descriptions of animals, and in "the means for effecting the same."

"The invention is designed for the purpose of guarding or "protecting plants from injury by ants and other wingless in-"sects, or by snails, caterpillars, worms, or other similar animals, "and the improvement consists in the novel application, adap-"tation, or employment of galvanic or electrical influence or "agency to the purpose. The plants to be protected are to be "surrounded by a galvanic arrangement of metals, either each "plant separately, if large, or if the plants are small the bed con-"taining them is to be surrounded, say, for instance, with an "edging or border of zinc, having a band of copper soldered or "attached upon its surface, whereby a galvanic action is set up, "and which will be found to effectually prevent the passage of

"insects or animals, for though the action may be but slight it "excites in a sufficient degree to prevent them crossing it. I "would remark that galvanic combinations of other metals may "be employed."

[Printed, 4d. No Drawings.]

A.D. 1863, February 21.—N° 477.

RÉMOND, ALFRED HENRY.—(*Provisional Protection only.*)

"Improvements in preserving provisions and in the apparatus "employed for such purpose."

1st. "Causing a current of electric fluid to pass through the "cases containing the provisions after they are finally closed up; "such electric fluid being made to pass along a fine iron or other "metallic wire through the case causes the wire to become red "hot and consume the oxygen."

2nd. "Placing inside the case (and in connection with the "thin wire) any known chemical agent, (such as common sulphur, "for instance,) which in its ordinary state has no particular "affinity for oxygen, but which upon becoming ignited (by "means of the electric wire above referred to) evolves any gas "(sulphurous acid gas, for instance) which will absorb, destroy, "or convert into a harmless gas the oxygen which is contained "in the case, and which it is desired to get rid of, or the sul-"phur or other agent may be ignited by any other convenient "means."

3rd. "After the case has been closed a sufficient quantity of "hydrogen gas is to be introduced therein to form (with the "oxygen which may be in the case) an explosive mixture or gas, "and this gas is to be then ignited by passing a current of "electricity along a metallic wire through the same, and thus all "traces of oxygen will be destroyed."

4th. "Placing the meat in the cases (after a short parboiling in "very fast boiling water, so as to coagulate the albumen,) and "boiling it as usual with the hole at the top of the case open; "after which the case is filled up entirely with boiling water or "liquid." The case is then closed, and "left immersed in the "hot bath for about an hour, more or less, according to the size "of the case, and the process is complete."

[Printed, 4d. No Drawings.]

A.D. 1863, February 24.—N° 505.

HOOPER, WILLIAM.—" Improvements in insulating and pro-
" tecting telegraphic and other wires and rods, and in machinery
" connected therewith."

Tapes or narrow strips of India-rubber, or compounds of India-rubber, for covering telegraph wires, are obtained "by cutting a " continuous sheet from a block of the material caused to rotate " in front of a knife," and afterwards dividing " this sheet into " tapes or narrow strips by a series of cutting edges, the interval " between which is the width of tape required."

Sulphur compounds of India-rubber may be vulcanized after the wires are coated, or they may be rolled into sheets, and the tapes obtained from the sheets as above.

Strips of cotton or cloth are obtained by the use of cutters, and are used for lapping round the India-rubber tapes.

"To keep them from adhering together," the India-rubber tapes are varnished on one or both side or sides with a varnish composed of shellac, water, and strong ammonia.

Before coating the wires, the strips are heated or cooled to a temperature of 60° Fahr.

In making joints, the joint or joints is or are laid in a tubular chamber formed of two semi-circular steam-heated chambers. Vulcanized India-rubber joints are immersed in a tar and sulphur bath, or in a bath of metal. Vulcanized India-rubber may be made to unite by coating it with India-rubber solution, and igniting the same " to produce tackiness ; " a coating of a sulphur compound of India-rubber is laid over the prepared surface, bound with cloth, and heated as above set forth.

An uniform motion of the lapping machine is obtained by means of two inverted cones, upon which the driving belt is moveable.

[Printed, 4d. No Drawings.]

A.D. 1863, February 25.—N° 516.

WILDE, HENRY.—" Improvements in electro-magnetic tele-
" graphs."

This invention consists in improvements in the transmitting instruments described in N°s 858 (A.D. 1861) and 1994 (A.D. 1861).

The armature axis of the magneto-electric machine carries a commutator, which causes the alternately inverted currents that come from the coils to pass in one and the same direction. These "direct" currents are again inverted, previous to their passing into the telegraphic circuit, by means of another commutator, driven by the index axis of the transmitting instrument, which is called a "differential commutator." The currents from the magneto-electric machine "are generated at a rate of not less "than twice the number of times that they are inverted by the "differential commutator." The depression of a finger key stops the rotation of the differential commutator, and causes the currents that circulate in the line wire to be all in one direction, thereby preventing the farther rotation of the indicator index. The motion of the armature is continuous. The differential commutator is driven from the same cranked axle as the magneto-electric machine.

In the magneto-electric machine, the coils of the armature are "wound in the direction of the axis of the armature," and the armature revolves within a cylinder, the opposite sides of which are formed by soft iron extensions of the poles of the permanent magnets. A "tail pin" supports the armature axis at the commutator end; the said commutator consists of two hardened steel cylinders cut diagonally.

The tension of the driving bands of the magneto-electric machine, and of the transmitting instrument, is regulated by means of adjustable pulleys.

[Printed, 10d. Drawing.]

A.D. 1863, February 25.—N° 529.

NEWTON, WILLIAM EDWARD (*a communication from Richard March Hoe.*)—"Improvements in producing stereotype plates "for printing purposes."

This invention relates "to a means of producing curved "plates. To this end the matrix is made on a sheet of steel or "other elastic substance, the normal shape of which is curved; "but in order either to cast the stereotype plate or to form the "printing surface *by electro-deposition*, the curved plate must be "made to assume a flat or straight form by being secured down "in any convenient manner to a flat plate, table or surface. The "clay, wax, or other suitable plastic material to form the mould

"or matrix is then put on the plate, and the impression is taken
"therein. The elastic plate is then released, when it assumes the
"curved form, and of course the matrix takes a corresponding
"form; the matrix or mould is then put on a curved plate or
"bed, and dried, and the stereotype plate is then cast or formed
"by electro-deposition."

[Printed, 8d. Drawing.]

A.D. 1863, February 25.—N° 533.

MACIVOR, ALEXANDER.—"Improvements in veneering or "overlaying woods according to two methods; first, by means "of steam exhaustion or steam pressure, or air exhaustion or air "pressure; secondly, by the employment of electro-magnetism."

"The method of veneering by electro-magnetism consists of "the employment of electro-magnetic force to press or urge "down a 'caul' upon the veneer. In this case an iron arma-"ture acted upon at one or both ends over a 'caul' is solicited "with force to the electro-magnet, and so effectively as to express "the superfluous glue from under the veneer and secure the "latter to the surface of the wood. The electro-magnet is fixed "in position, and secured strongly to framing, and so also the "other end of the armature, when one power alone is employed, "is hinged to an opposite part of the framing. Between these "two points an adjusting table is made to move by a screw, so "as to suit the different thicknesses of the wood and 'caul,' "which at any time may be employed in the process of working."

"A combination of electro-magnets could be made to veneer "the largest surfaces, and one such might be employed with "advantage in executing very minute work, such as occurs in "inlaying in marquetry and buhl work."

[Printed, 10d. Drawing.]

A.D. 1863, February 26.—N° 547.

NODDER, RICHARD JOSEPH.—"Improvements applicable to "hats, caps, helmets, military head dresses, and other like cover-"ings for the head."

This invention consists "in the application of a peculiarly con-"structed zone, band, or ribbon, connected by its lower edge to "the lower edge of the interior of hats, caps, helmets, bearskins,

" shakos, or other military head dresses, and other like coverings
" for the head, for the purpose of giving ease and comfort to the
" wearers thereof, by causing every part of the lining of the hat to
" accommodate itself to the cantour " [contour?] " of the head of
" the wearer."

" This my improved band or ribbon of which the zone is formed
" in appearance much resembles an ordinary gauze ribbon, but
" the upper portion of the warp of the ribbon is formed of thin
" metallic wires, or other suitable material that is pliable but non-
" elastic in its length, and having the lower edge or selvage warp
" formed of silk, cotton, mohair, linen, or other suitable soft
" material, of which also the weft of the band or ribbon is formed.
" This my improved band I attach to the lower edge of the in-
" terior of the hat or other covering for the head by its soft textile
" selvage at the back of the leather or other lining."

" In some cases I prefer to form the wire portion of the ribbon
" of two metals, (say, copper and zinc,) for the purpose of obtain-
" ing *a slight galvanic action*."

[Printed, 8d. Drawing.]

A.D. 1863, March 3.—N° 587.

SYMONDS, THOMAS EDWARD.—" Improvements in the ap-
" paratus for steering ships."

1st. " A novel mode of constructing and working rudders for
" steering ships and other vessels, by which additional surface and
" increase of rudder power can be given when required."

2nd. " The mechanical means employed for transmitting the
" motion of a steering wheel and the power applied thereto to the
" rudder of a ship, by which jerking and undue straining are
" avoided; a simplification of the tackles and intermediate con-
" nections is effected, and the risk of wringing or twisting the
" rudder head prevented, and by which also fewer hands are en-
" abled to steer a ship in the heaviest weather."

The Specification describes and the Drawings show :—" Appa-
" ratus in combination with chains or ropes " to transmit manual
power through steering wheels to the tiller of rudders. Com-
pound rudders. Certain mechanical means " of working auxiliary
" rudders or sliding pieces." Methods for operating " the slid-
" ing pieces contained within or connected with (either internally
" or externally) the main rudders."

"Instead of employing iron, *the presence of which affects the* "*working of the compass*, the whole of the framing and gearing "may be cast and made in hard gun metal, and white metal "bushes may be employed in the bearings."

The employment of non-magnetic metal to prevent the influence of local attraction upon the compass is not mentioned in the Provisional Specification.

[Printed, 1s. 2d. Drawings.]

A.D. 1863, March 3.—N° 594.

PRICE, George, and DAWES, William.—"Improvements "in burglar-proof safes and strong room doors and frames."

1st. "An improved construction or arrangement of the details "of iron safes and doors and frames whereby greater strength "and security are obtained." "A small unpickable and gun-"powder-proof lock" is used.

2nd. "Improved means of rendering" "the doors or other "portions of the 'bodies' of safes or strong room doors, 'drill-"'proof, 'tap-proof,' or 'screw-proof.'"

3rd. "Protecting the inside or works of the small lock from the "action of 'acids' or other chemicals applied through the 'key-"'hole.'"—"To effect this we '*electro-gild*' them, or coat them "to any desirable thickness with gold or other suitable metal for "resisting the action of 'acids' or other chemicals."

[Printed, 8d. Drawing.]

A.D. 1863, March 4.—N° 613.

CRAIG, James.—(*Provisional Protection only.*) "Improvements "in apparatus for detecting and detaining thieves, and indicating "the presence of fire."

In applying this invention to a safe the following apparatus are included in the circuit of a galvanic battery:—An electro-magnet, which is fixed beneath a trap door "constructed in the floor im-"mediately in front of the safe;" the armature lever, in conjunc-"tion with a catch lever," supports the trap door as long as the electro-magnet is not excited. A bell alarum. Springs or contact pieces, which complete the electric circuit by the movement of the guard plate of the keyhole. An electro-magnet, inside the safe, "which acts when excited upon a hooked lever, and forces

" its hooked end through a hole in the bolt of the lock, so as to " effectually prevent its being stirred until the circuit is broken."

A branch circuit extending from the electro-magnet in the safe to the alarum, includes a thermometer tube, the mercury of which completes the electric circuit when heat is applied to the safe.

On raising the guard plate, it "establishes an electric circuit " throughout the entire apparatus, the result of which is the " simultaneous falling of the trap door" (" depositing the thief " in a suitable vault or chamber below the floor"), " the ringing " of the alarm bell, and the securing of the bolt of the lock. " When fire is applied for the purpose of destroying the safe or " lock the mercury in the tube rises until it comes in contact with " the wire above it, and consequently establishes a circuit, which " causes the alarm bell to be rung."

[Printed, 4d. No Drawings.]

A.D. 1863, March 6.—N° 633.

JOURDIN, MICHEL.—(*Provisional Protection only.*) " Im- " provements in machinery for engraving by means of electri- " city."

" The pattern intended to be reproduced is first engraved by " hand or by any other process at least four times larger than the " engraved plate required. This pattern plate is filled up with an " insulating material, and it is adjusted on a frame connected " with the machine. In front of this plate thus prepared and ad- " justed to the frame is placed a small metallic point, made " slightly to press upon it and in communication with one of the " poles of an electric battery. On another frame is adjusted the " metallic plate or any other object to be engraved, such as watch " cases, dials, jewellery, or other articles. In front of this is placed " a small graver pressing on the article to be engraved, or being " pulled from it through the medium of an electro-magnet. " Both of these frames are always turning during the opera- " tion, but the metallic point in front of the pattern frame, and " the graver in front of the other frame, are both susceptible " of moving in a longitudinal direction, but do not advance with " the same speed, their speed depending on the relation between " the size of the pattern plate and the plate to be engraved; this " motion is obtained by the use of two wheels placed the one

" with the slide supporting the point in front of the pattern, " the other with the slide supporting the reproducing graver."

[Printed, 4d. No Drawings.]

A.D. 1863, March 9.—N° 653.

HUGON, Pierre.—" Improved machinery for obtaining and " applying motive power."

This invention consists of a gas engine, in which the explosive force of the gaseous mixture acts " upon an intermediate column " of water, and thus indirectly upon the piston. The cylinder, in " which the piston works, is separated from the tubes wherein the " explosion takes place; the power resulting from the dilatation " of the gases is employed to expel a certain quantity of water " from the explosion tube and to produce a vacuum, the effect of " which is added to that due to the condensation of steam arising " from the combination of the hydrogen and oxygen and can be " utilized in the cylinder.

" The several reservoirs of the engine are arranged in such " manner that the same water always circulates in the engine, " and that that which has been expelled from the tube fills the " cylinder on the side opposite to the chamber, which is at the " moment in connection with the vacuum produced. The cylinder " being originally full of water it is the exhausting towards the " vacuum of the liquid contained in one of the chambers which " produces the movement of the piston; the water expelled from " the tube which fills the opposite chamber, the capacity of which " increases gradually, acts in the same manner at the following " explosion." " Water enters every part of the engine."

The mixture is exploded either by means of " an electric spark " an incandescent platinum wire," or " a gas jet." The slide lever shaft of the engine bears " rollers or discs, made of hardened " india-rubber, or other insulating material, carrying copper " plates, which transmit the electric spark" from an induction coil " at the proper moment to explode the mixture."

[Printed, 2s. 10d. Drawings.]

A.D. 1863, March 11.—N° 662.

BROOMAN, Richard Archibald (*a communication from Florent Babin*).—(*Provisional Protection only.*) " Improvements in " voltaic belts and bandages."

"This invention consists in constructing belts and bandages com-
"posed of a bi-metallic core, consisting of plates, strips, or blades
"of metal, one electro-positive to the other, such as copper and
"zinc, forming a voltaic battery, juxtaposed or placed one against
"the other, and covered with same fabric or material which will
"keep them in place, and to which buckles, tapes, or other means
"of fastening are applied to secure them to any desired part of
"the body. The plates, strips, or blades may be of any form
"according to the part to which they are to be applied. The
"moisture of the body will generally suffice to excite the bandages
"to action. In some cases, however, they may be excited by
"vinegar, or dilute acid more or less strong. The inventor gives
"the name of volta-hygienic bandages to these new appliances."

[Printed, 4d. No Drawings.]

A.D. 1863, March 11.—N° 670.

WERGE, JOHN (*a communication from Alexander Ross*).—
"Improvements in apparatus for indicating any regulated maxi-
"mum or minimum degree of temperature."

This invention consists "in the employment of a compound
"metallic strip fixed at one end to a connecting piece in commu-
"nication with one of the poles of a galvanic battery, whilst its
"opposite end is free to move to or fro by the action of heat or
"cold upon the two metals composing the compound strip, as is
"well understood. In combination with this strip there is an
"adjustable indicator or pointer turning upon a fixed centre, and
"capable of being adjusted to any degree of heat or cold upon a
"properly divided thermometrical scale. This indicator is in
"communication with an electric alarm, and through it with the
"opposite pole of the battery." Upon the elevation of tempera-
ture, the strip comes into contact with the indicator and the
electric circuit thus established rings the alarm bell "until the
"original temperature is restored again."

"By the combination of the index arm, scale, and metallic
"strip with a battery, alarm apparatus, and key board," notice
can be given of the attainment of maximum temperature at any
number of points, and the particular locality where the increase of
temperature has taken place can be indicated.

If the strip be placed on the opposite side of the index arm to

that above-mentioned, the attainment of the minimum temperature will cause the alarm bell to sound.

"By employing a double index the instrument may be em-
"ployed for giving an alarm in case of either an increase or dimi-
"nution of temperature above or below certain limits, capable of
"regulation at pleasure."

[Printed, 8d. Drawing.]

A.D. 1863, March 14.—N° 695.

ALEXANDER, Robert.—"Improvements in mariners' com-
"passes and the parts in connection therewith, and in the
"application thereof to magnetic instruments."

The object of these improvements is to prevent the action of local attraction upon the magnetic needle.

This invention relates to improvements upon the invention described in N° 2611 (A.D. 1862).

This invention consists of the following improvements:—

1st. "The application of adjusting and compensating magnets,
"placed on the compass card or cards, their forms, shapes, and
"position being regulated as required, or placed on a metallic
"rim to encompass the edge of the cards, or placed below or
"above, or both above and below the cards as circumstances may
"require."

2nd. "The use of ebonite and aluminium metal" in connection with this invention.—Ebonite is used "for cards, bowls, rims,
"gimbals, and other parts in connection with the compass."
"Aluminium metal" is used "for compass cards and other parts
"in connection."

3rd. "The use of hollow iron spheres or spheroids to encom-
"pass a part or the whole of the apparatus."

4th. The use of a tube, India-rubber spring, and "moveable
"pivot," to support the compass card.—A vertical magnet bears at its apex a tube fixed to an India-rubber ball which rests upon shoulders on the said magnet; the tube carries the steel pivot and can be removed from the magnet.

"Electricity or galvanism" may be applied "in conjunction
"with a part or the whole of the aforesaid appliances."

This invention may be applied "to electric magnetic instru-
"ments."

[Printed, 10d. Drawing.]

A.D. 1863, March 16.—N° 704.

VERNON, William.—(*Provisional Protection only.*) "A new "or improved means or apparatus for communicating signals or "intelligence to or from railway trains, or other similar con- "veyances, whether they be stationary or in motion."

Insulated conducting rods extend the whole length of the railway, "and I provide telegraphic apparatus in connection with "the conducting line to each station on the line of railway, and "to each break van and engine, and to one or more carriages, or "to either or any of them, and in addition to the telegraphic "apparatus furnished to and in connection with the train I pro- "vide each carriage, van, or engine or either or any of them "with a vertical or other rod or rods passing through a non- "conducting substance, each rod having at its lower end a truck "or pulley somewhat broader than the conducting line. Above "the truck is a spring which presses down the truck on the "conducting line so that while the carriage is in motion, or as "it remains stationary, it can receive a message or signal from "the station it has left or the one towards which it is proceeding, "or the guard or other person may send a message or signal to "either of such stations, or may receive or send a message or "signal from or to any signal man having in his signal box a "telegraphic apparatus in connection with the conducting lines. "And in order to prevent the electric or other current from "passing through or proceeding beyond the train, I provide one "or more rods in connection with the apparatus in each carriage, "such rod or rods being in connection with the axles of the "wheels or other parts of the carriages to conduct the current to "earth. The guard or other person may send forward or back- "ward the message he receives or the answer thereto from his "apparatus."

[Printed, 4*d*. No Drawings.]

A.D. 1863, March 19.—N° 739.

CROCKER, Samuel Leonard.—"A new and useful or im- "proved yellow metal sheathing nail or spike which by means of "of a nail-cutting engine is cut from yellow sheathing metal."

Muntz' sheathing metal "is rolled into plates of sufficient "thickness and shape to be cut up into nails;" the inventor has

"discovered that by heating it to redness or thereabouts, and "while so heated introducing it into the nail or spike machine, it "may be safely cut up into nail blanks, and each of said blanks "be headed by the machine. After the nails or spikes, as the "case may be, have been thus made, they are to be again heated "to or about to redness and when so heated they are to be "plunged into cold water, in consequence thereof their brittleness "will be so overcome as to render them capable of being bent or "driven without that danger of being broken under such opera- "tions as the common cast composition nails or spikes would be "subject to."

"The yellow metal nail made of copper and zinc in the same "or in substantially the same proportions as such metals are "combined in order to produce the yellow metal sheathing pre- "vents, when it is used to confine the yellow metal sheathing to "a vessel's bottom, *any galvanic action*, such as takes place when "either copper or composition nails are used. This galvanic "action destroys the metal but protects the nails. When the "metals are combined in the nails in different proportions to "what they are in the sheathing more or less galvanic action "accrues, this always tending to the destruction of the metal "immediately around the nails."

[Printed, 4d. No Drawings.]

A.D. 1863, March 24.—N° 768.

COOK, HENRY (*partly a communication from Gaetano Bonelli*). —(*Provisional Protection only.*) "Improvements in the arrange- "ment and construction of apparatus for transmitting electric "currents and signals for telegraphic purposes."

1st. An arrangement "by which electric currents may be trans- "mitted in opposite directions between two stations."—In order to reduce electric induction and the retardation of signals, a given current is sent in a given direction to produce the signals, and a stronger current is sent "in the opposite direction during "the intervals between the signals," by means of a commutator. "The signal apparatus is automatic;" "the teeth," "which are "in connection with the writing comb, are thus lifted from the "mercury cups which are in connection with the positive poles of "the batteries, thus making good the connection at the moment

" they are wanting, and throwing the combs out of circuit when " not in use."

2nd. " The form, arrangement, and operation of the receiving " and transmitting combs."—" The pressure of the points of the " combs on the type " is regulated by the action of India-rubber springs upon the tails of the combs. " The working points of " the combs " are " V-shaped," and anti-friction rollers attached to the bar of the comb " support the points of the combs as they " travel along."

3rd. Duplicate dispatches are produced simultaneously by means of a bifurcation of the end of each conducting wire; two combs can thus mark two paper strips simultaneously.

4th. To make the signal marks " clearer than heretofore," " the " ordinary thick down strokes of the letters " are made thin, " while the horizontal lines are made thick so as to receive the " combs with more certainty."

[Printed, 4*d*. No Drawings.]

A.D. 1863, March 26.—N° 795.

DAVIES, George (*a communication from Louis Charles Emile Vial*).—" Improvements in engraving upon metals."

This invention " is based, firstly, on the precipitation of " metallic salts by metals; secondly, on the affinity of acids for " the different metals; and, thirdly, on the phenomena of " electro-chemistry ; " it consists in :—

1st. " Writing or drawing on paper (to be afterwards trans- " ferred by moisture and pressure), or in writing or drawing " directly on metal with a metallic ink susceptible of precipi- " tation on another metal by the simple fact of contact under " certain conditions."—Zinc or steel may be written upon with sulphate of copper solution; the copper is deposited, " and it is " only requisite then to 'bite in' with the ordinary acids to have " an engraving in intaglio or in relief."

2nd. Reproducing old engravings.—The original is soaked in a metallic solution, and the drawing or writing is then transferred to the plate by pressure, " to be afterwards 'bitten in.' " In a second process the engraving is " set off " on to steel " by means " of a soap composed of turpentine or petroleum, and the plate " is then plunged in an acid bath of sulphate of copper."

3rd. Tracing on metal, or transferring on to metal, "and en-
"graving this transfer by the process just described;" drawing
"with any body capable of resisting the deposit of copper
"without opposing the attack of the acid."

4th. The application of electricity to the inventor's discovery, and the use of "the voltaic pile to deposit the copper on to "the steel in order to effect the 'biting in' direct, the process "consisting in dispensing with varnish and 'biting in' the "steel direct, using copper instead of varnish as a resisting "medium."

[Printed, 4d. No Drawings.]

A.D. 1863, March 28.—N° 809.

PERRY, Archibald Hewison.—(*Provisional Protection only.*) "Improvements in working railway points, switches, and signals, "and in the apparatus to be employed for that purpose."

"For the purpose of ensuring the points or the signals being "in the position intended or due to the movement of the lever "handle by the pointsman, although he may be at a considerable "distance from such signals and from the points, I apply to each "pair of points, and to the face or edge of the rail into which it "is intended the point or tongue is to come in close contact, a "piece of copper or other suitable conducting metal, and by in-"sulating each piece of metallic conducting surface from the "rail or rails and connecting it by means of a wire with a bat-"tery and telegraph instrument and to the earth, the perfected "contact is signalled on the opening or closing of each pair of "points or switches. Thus it will be understood that when the "points are only partially opened or closed from some defect in "the apparatus, their actual condition will become known, and "the pointsman or signalman will become aware of the unsafe "condition of the points or the imperfect working of the sig-"nalling apparatus.

"Several signals may be combined together, and the condition "of one pair of points may be indicated at more than one place, "and be employed to regulate the working of other points and "signals.

"I apply a similar arrangement of apparatus between the dis-"tant or other signals and the post or standard to which they

" are fitted, and scotch blocks on sidings and level crossing gates " may be similarly fitted and worked."

[Printed, 4d. No Drawings.]

A.D. 1863, March 31.—N° 830.

BROOMAN, Richard Archibald (*a communication from Theodore Auguste Marie Sortais*).—" Improvements in electric " telegraph printing apparatus."

This invention consists of improvements upon the invention described in N° 2864 (A.D. 1858).

1st. To diminish the length of the printing lever, the electro-magnets are placed as near as possible to the paper rollers.

2nd. The " printing lever " consists of a " balance bar " fixed to a " transmitting " or printing arm; an adjustable helical spring reacts upon this lever against the electro-magnet. From the " balance bar " two arms project, one to make battery contact, the other to assist in regulating the " extent of the " contacts."

3rd. The " transmitting arm " is united to the " balance bar " by a sliding joint, a spring holds the said arm to the side of the balance bar; the sliding joint removes the arm from the ink tracer when necessary; one end of the spring " is hooked to " enter into one or other of two notches, one of which serves to " make the apparatus a commutator and the other a receiver."

4th. The automatic releasing of the clockwork is effected by means of a " bent plate," which is fixed to the " transmitting " arm." " A regulating screw, which passes through the plate," rests upon a spindle that is fixed to the clockwork click.

5th. The " transmitting arm " is bent to allow to the paper rollers freedom of action. The paper strip from the drum is guided between two rollers, " the lower of which is driven by the " clockwork;" it then passes under certain loose rollers which " prevent the tracer drawing up the paper after making its " impression."

6th. The tracer passes through the bottom of the conical ink vessel, the point of the cone of the ink vessel being downwards; a spring raises the tracer after its contact with the paper.

A Morse apparatus with these improvements is described and shown.

[Printed, 1s. 2d. Drawings.]

A.D. 1863, April 8.—N° 883.

SIMPSON, William.—(*Provisional Protection only.*) "Im-
" provements in insulating the magnetic needle or needles in
" compasses."

" My invention relates or is applicable to all magnetic needles " used in mariners, azimuth, and other compasses and has for " its object the insulation of such magnetic needles that they " will practically be insensible to or uninfluenced by local attrac- " tion. And although I prefer to employ it in connection with " the system of applying electricity to compasses patented by " John Sacheverell Gisborne and myself, the said William " Simpson, of date the 14th February 1863, N° 401, it is not " exclusively so applicable.

" Magnetized needles of the ordinary shape, or of one similar " thereto, are each enclosed wholly or partially, but preferably " with the ends, and also the edges of the centre pieces open in " an insulating material, say of gutta percha, india-rubber, or " any of their compounds, and such magnetized needles so coated " are each placed or enclosed in a soft iron or other metallic box " of the same form as the coated or insulated surface of the " needles. The cards are attached to the outer casings in the " same way as they are now attached to the needles and the " action is exactly the same, for the centre blocks and points car- " rying the whole as at present are used."

[Printed, 4d. No Drawings.]

A.D. 1863, April 16.—N° 955.

McLAY, John Laird.—(*Provisional Protection only.*) "Im-
" provements applicable to mariners' compasses."

" The object of this invention is to render the mariner's com- " pass independent of local attraction generally when placed on " board an iron ship, or in any other situation, where the ordi- " nary compass would be acted upon by local influences, and " consists in surrounding the compass with a ring or zone of " brass or other suitable material, to which is attached a number " of curved magnets placed at equal distances from each other, " with their poles pointing outwards. These magnets may be " placed either in a vertical or horizontal position, but it is pre- " ferred in most cases to place them vertically; but in all cases " the poles are reversed or placed alternately; and in some cases

" it is preferred to connect the magnets by a wire or conductor,
" and it may be found desirable to exhaust the air from the
" compass bowl. The needle is placed so as to be in the plane
" of the centre of the length or bredth of the curved magnets
" which move with the compass bowl."

[Printed, 4d. No Drawings.]

A.D. 1863, April 17.—N° 963.

KNIGHT, Richard.—"Improvements in treating and pre-
" paring iron, copper, and other wires for telegraphic and other
" uses, for the purpose of preserving them from corrosion or
" decay."

This invention consists in coating the said wires with "pure
" metallic tin."

In carrying out this invention, the wire is first thoroughly cleansed by "pickling" it in "sulphuric or other acid solutions," it is then "operated upon by rubbing surfaces," to which silver sand is continuously supplied, "conducted through a vessel con-
" taining spirits of salts," "thence, whilst wet, into a bath of
" pure melted tin, and as the wire emerges from the bath the
" access of metal adhering thereto is removed by suitable wipers."

"The wire thus coated is, by preference, conducted through
" or between two pairs of adjustable grooved or other form of
" metal rollers, one pair being placed horizontally and the other
" pair vertically, or they may be placed diagonally or in other
" suitable positions, so as to be at right angles or nearly so to one
" another, by which the coating of tin is compressed upon the
" the surface of the wire in two or more different directions."

It is stated that, by this invention, "the pores of the tin" are so completely closed up "as to prevent the coated wire from
" being chemically acted upon by acid or other solutions, or from
" the oxygen of the atmosphere, or from other atmospheric,
" gaseous, aqueous, or submarine influences."

[Printed. 6d. Drawing.]

A.D. 1863, April 21.—N° 986.

RAFTER, Henry.—"An improved process for obtaining printing
" surfaces."

The design is drawn in adhesive ink upon some porous or pervious substance, "such as paper, unglazed porcelain, or cloth."

"A sheet or film of rubber is then pressed on the drawing or "transfer," and the compound sheet is made to form one of the sides of an air-tight compartment, the India-rubber being placed outwards; on air being compressed into the air-tight compartment, the rubber is made to project in convex surfaces from the porous sheet or plate, but is firmly attached to the plate at the places covered with adhesive ink. A mould is thus formed, "which "being made conducting *an electrotype can be taken* which will be "a surface fit for printing from. Should the drawing, writing. "or transfer be so made that the adhesive ink forms the lines of "the writing or drawing, the rubber will project from those parts "technically termed the 'whites,' and the electrotype will be "suited for a typographic press, the lines being in relief. Should "the drawing ,writing, or transfer be so made that the adhesive "ink forms what is technically termed the 'whites,' the electrotype "will be suited for a copper plate press, the lines being sunk."

Electrotype reproductions of engravings, lithographs, or photographs may be obtained by processes similar to those above described, but in which the details vary according to the circumstances of the case.

[Printed, 4*d*. No Drawings.]

A.D. 1863, April 25.—N° 1035.

BRUET, Louis Alexandre Joseph.—"Improvements in apparatus for registering, indicating, and verifying the time and "distance passed over by vehicles, also applicable to machinery "and other similar purposes."

"A suitable external sign is placed on the front and top of the "case of the mechanism, or on the driver's box, for indicating "that the vehicle is disengaged or not hired; but when a fare is "taken, the driver turns a handle a quarter of a circle, causing "thereby the external sign to be lowered and to disappear, and "at the same time to actuate the gearing required for the motion "of the apparatus or mechanism of the distance index."

"The verification or proving of the time employed during the "driving and stopping of the vehicles takes place by the vibration of a hammer fixed at the end of a spring attached to a "support screwed to the frame plate."

The extremity of the axis that carries the handle of the apparatus bears "a grooved cam or eccentric." "The above apparatus

" is enclosed in a box, and the said axis passes beyond to receive " the cam. Motion is given by an eccentric placed on the nave " of one of the back wheels. The reciprocating motion of the " eccentric disengages one of the teeth" of a "ratchet wheel and " gives the movement to the mileage wheelwork. Instead of this " arrangement I obtain the required motion by putting in contact " for each turn of the wheel *two electric wires*, the battery being " placed in any suitable part of the vehicle, and the electric mag- " net of which is placed so as to produce the attraction of an " armature, causing one of the cogs of the said ratchet wheel to " be disengaged."

[Printed, 1*s*. 6*d*. Drawings.]

A.D. 1863, April 28.—N° 1069.

MOORE, THOMAS.—" Improved apparatus for laying down, " protecting, and controlling submarine cables for telegraphing " from vessels moored off a coast to the shore."

1st. " Buoying a telegraph cable so that it will swing with the " vessel and not foul."

2nd. " Having a second end of electric cable from the main line " anchored and buoyed outside a circle described by the ship's " swinging in the opposite direction of the line to the shore to be " taken inboard whenever required." This part of the invention is mentioned in the Provisional Specification.

The cable is buoyed in the following manner :—" The ship can " ride by two cables to the anchors or by bridles running out " from the fore quarters and secured by a swivelled link to a " single chain. To the chain cable by which the vessel is an- " chored are ropes or chains securing floating buoys on the " surface of the water. A rope or chain also is attached to the " vessel's anchor. On the top of each buoy is a swivelled ring " with friction rollers between or through which the electric cable " is passed. The buoys attached to the mooring chain are " placed at given distances from each other."

The other principal features of this invention are :—

" Grippers" for the cable, attached to a buoy with an independent anchor.

A " skeleton framing " for capstan or windlass, to pay out telegraph cables or to run them in.

A hinged arm, from the stern of the vessel, bearing on a spring, checks the submarine cable.

Arrangements of ratchets and pawls, in connection with waved or pinned sheaves, constituting a safety block, or otherwise, to stop the cable.

[Printed, 1s. Drawings.]

A.D. 1863, May 8.—N° 1155.

DROOP, Justus Charles.—(*Provisional Protection only.*) "An instrument or holder for holding nails, screws, or other "fastenings."

"This invention consists in magnetizing or applying magnetism "in connection with a tool called 'a tack or nail holder,' by which "means tacks, nails, screws, or other similar fastenings may be "picked up and held by magnetic attraction in the right position "for driving with a common hammer or screwdriver. The pick- "ing up part of this 'tack or nail holder' I prefer to construct "with a claw, and having a collar of india-rubber, gutta percha, "or other suitable non-conducting material to prevent the tacks "or nails, screws, or other fastenings adhering thereto otherwise "than to the exposed magnetized part of the 'nail holder' which "is presented to the tack, nail, or screw to be picked up. The "claw is also convenient for taking out tacks or nails when re- "quired. The head or end of the 'nail holder' may be magne- "tized by any of the ordinary well known methods employed for "magnetizing or rendering articles magnetic.

"I do not confine myself to any particular form of the nail "holder, as they may be greatly varied in external form without "departing from the nature of my invention, which consists in "employing a magnetized instrument for picking up and holding "tacks, nails, screws, or other similar fastenings in a position to "be driven by a common hammer or screwdriver."

[Printed, 4d. No Drawings.]

A.D. 1863, May 13.—N° 1199.

BROOMAN, Richard Archibald (*a communication from Adolphe Pelegrin and Auguste Garbeiron*).—"Improvements in "laying submarine telegraph cables."

"This invention consists in connecting to the cables, as they "leave the vessel from which they are paid out, buoys fitted as "hereafter explained, and which after a certain time lose their "buoying properties, whereby a nearly constant tension is main-

"tained on the cable. In addition to the buoys, in some cases "heavy weights are attached to cause the cable to descend to the "bottom of the water in which it is being submerged. The buoys "are, by preference, in the form of balloons, of caoutchouc or "waterproof cloth, and when not extended occupy little space in "the vessel. These buoys are provided with a tap, in which there "are two ways, one for the admission of air, and the other closed "by wire gauze for the escape of air; the wire gauze is covered "by gum or other material, which will dissolve after exposure to "water, and according to the nature and thickness of this cover-"ing so will the air escape more or less quickly after the balloons "have been submerged. The balloons are attached to a cord, the "lower end of which carries a weight, and as the cable is leaving "the vessel the balloons are attached by throwing or twisting the "weighted end of the cord round it. Instead of balloons, or "together with balloons, buoys in the form of parachutes may be "connected to the cables in a similar manner to the balloons."

[Printed, 8*d*. Drawing.]

A.D. 1863, May 13.—N° 1200.

WILDE, Henry.—"Improvements in electro-magnetic tele-"graphs."

This invention "consists of improvements in the indicating "instrument" described in N° 858 (A.D. 1861).

"In the indicator therein described a revolving index is made "to point successively to letters engraved upon a stationary "dial.

"In the present improvement the dial instead of being "stationary is made to revolve, and before it a magnifying glass "or microscope of suitable size is so placed as to cause only the "required letter on the revolving dial to be visible to the person "receiving a message when the dial stops. This magnifying "glass is mounted eccentrically on one extremity of a hollow "cylinder of glass; the other extremity of which is fitted into a "brass collar which is screwed into the front of the globe through "which the small dial is seen for the purpose of adjusting the "focal distance, and also for placing the eye piece opposite any of "the characters on the dial."

"Instead of employing a lens of the form above described an "ordinary lens may be used, in combination with a screen or

" diaphragm placed before the dial a short distance from the lens,
" or the lens may be so small as to allow only one letter of the
" dial to be seen at once."

[Printed, 8d.. Drawing.]

A.D. 1863, May 23.—N° 1301.

BROOMAN, RICHARD ARCHIBALD (*a communication from Albert Mayrhofer, Adolf Stepski, and Martin Crachi.*)—" Improvements in indicating the position of trains upon railways, and in apparatus employed therein."

" The apparatus consists of five principal parts :—1. The chief apparatus with a flat surface table, upon which is drawn in miniature the course of the line. 2. The motive power, that is to say, the battery. 3. The apparatus for interrupting the current (tactile apparatus), placed on the line, say, at every mile. 4. The wires which connect the apparatus named in clause 3. 5. The current breaker attached to one of the carriages in the train."

Each train to be indicated has an arrow and " toothed rail" corresponding to it; and each arrow moves and stops as the train does. The " chief apparatus " also contains clockwork, actuated by a spring, and regulated by an electro-magnet in connection with the " tactile apparatus." Whenever the electric circuit is closed, after having been broken, the clockwork is set free and moves the arrow (by means of its rack) one degree; the detent of the clockwork is restored to its place after the motion of the arrow, and is not set free until the next breakage and subsequent closing of the circuit. The train to be indicated carries a hook or " current breaker," that, in passing, strikes against the lever of the " tactile apparatus;" the lever is restored to its former position, so as to again complete the circuit, by means of a spring. Each train has its own battery, " tactile apparatus," connecting wires, and current breaker.

[Printed, 10d. Drawings.]

A.D. 1863, May 28.—N° 1337.

BOUTET, CHARLES THOMAS.—(*Provisional Protection only.*) " A new or improved instrument for measuring distances & altitudes."

" This instrument is based on a triangulation system, and consists of a wooden tripod or support with moveable arms, having a table above a column fixed on a triangle, which is mounted on

" the table of the tripod by means of three screws which regulate " the level of the instrument, which said column is fixed in the " centre by a strong screw with springs; at the upper part of the " column a horizontal circle is fixed for supporting the upper " parts of the apparatus, and a second moveable circle for the " purpose of registering, and which pivots horizontally on the " first circle in the centre of the column." Certain rules, sliding pieces, telescopes (two in number), verniers, and graduated circles also form a part of the apparatus.

" A *compass* is fixed between two of the arms of the graduated " circle and indicates the east."

" The whole of the various parts of the instrument, with the " exception of the tripod, may be made of copper or of any other " metal that has no influence on the needle of the compass, the " said parts being mounted by means of ordinary screws and " screws with springs, and the moveable parts are fixed at the " time of operating by means of pressure screws."

[Printed, 4*d*. No Drawings.]

A.D. 1863, June 20.—N° 1553.

JENKIN, Fleeming.—(*Provisional Protection only.*) " An " electric tell-tale compass."

" The object of the invention is to obtain from a compass " placed in one part of a vessel (which compass is herein-after " called the sending compass) indications of the direction of that " compass at a distant part of the vessel, on an apparatus or " instrument (herein-after called the receiving instrument), by " means of electric currents transmitted along insulated wires."

" The manner of effecting this is as follows:—From one pole " of a battery or other rheomotor an insulated wire (herein-after " called the single wire) proceeds to and is in metallic connection " with a contact piece attached to and moving with the needle of " the sending compass. From the other pole of the battery a " hundred other insulated wires (more or fewer, but for distinc- " tion I call them 'the hundred wires,') proceed first to the " receiving instrument and thence to the sending compass, where " they are connected with terminals, which terminals are arranged " at equal intervals round the sending compass. The contact " piece there touches either one terminal or two adjacent ter- " minals, and completes the circuit through the single wire and " the one or two (as the case may be) of the hundred wires. The

"currents so sent give 200 different signals at the receiving "instrument and indicate the position of the sending compass "within $\frac{1}{400}$th of its actual direction."

"By breaking the circuit of such of the hundred wires as are "within a given angle of the course which is required to be "steered the receiving instrument may be made to ring a bell or "give an alarm whenever the ship's course deviates from the "given course by that angle."

[Printed, 4d. No Drawings.]

A.D. 1863, June 24.—N° 1595.

SKINNER, THOMAS.—"Improvements in the ornamentation of "silver, German silver, Britannia metal, *electro-plated* or other "plated goods."

"I propose to fix by casting or other means into the various "parts of the article to be decorated jewels, precious or other "stones, glass studs, or composition jewels by casting. The "following is the process to be adopted;—I take an ordinary "mould used by Britannia metal smiths, or any mould answer-"ing the purpose, and make or cut a hole or cavity therein at "any desired position or positions, and place the jewel, stone, "glass or other ornament in such cavity or cavities, and I then "run in the molten metal in the ordinary way of casting, the "metal running round the stone, stud, or jewel holds it fast, "leaving their surfaces exposed to view. The part now con-"taining one or more studs, stones, or jewels is ready for making "up into an article" "*and then plated* and finished."

"By another method I propose to fix the ornaments after the "manner in which jewellers set stones in rings and other objects "by means of claws. This method would be especially applicable "to German silver articles."

"I also ornament combs by using pieces cast in Britannia or "other metal with stones or jewels embedded therein by casting "as described in the first process, *and afterwards plating or gild-"ing the metal.*"

[Printed, 4d. No Drawings.]

A.D. 1863, June 24.—N° 1596.

BRAE, ANDREW EDMUND.—"Improvements in apparatus for "actuating domestic bells and other signals by the electric "current."

In these "improvements the electric current being put into "action by 'touch' in the usual way, traverses an electro-magnet, "and causes it to attract an armature and withdraw a detent, "whereupon an arm or lever falls by its own gravity" and thus "conveys a conspicuous indication of the place or person whence "the call, of which notice is at the same time given by a bell or "other signal, has proceeded." "The indicating arm projects "from a central boss or pulley with which it revolves, and which "has round it a chain or band to form a pull, by which the arm "may be again set up by an attendant at the same time that its "indication is noticed. Upon the central boss are ridges or "cams for the purpose of producing automatically by their action "upon commutating springs certain changes in the course and "direction of the electric current."

The ordinary "bell lever" is adapted to carry out this invention, both in respect to the "touch" or sending apparatus and to the indicating mechanism.

The electric circuit completed by the fall of the above mentioned lever includes an electrie bell, therefore the "successive and sepa-"rate" action of the electric current is employed in this invention, instead of including the bell and indicator in the same electric circuit.

By the addition of certain springs and contact studs, "an an-"swering indication from the attendant to the caller can be "made."

[Printed, 8d. Drawing.]

A.D. 1863, June 29.—N° 1620.

ANDREWS, WILLIAM.—"Improvements in apparatus for in-"sulating electric telegraph wires."

"When projecting arms are used fixed to uprights, the outer "ends of such arms, where the ordinary insulators for supporting "the wires are applied, have inverted box-like sheds applied. "These sheds are made of glazed earthenware or other suitable "material; they are closed at top, at the two sides, and at the "outer ends, and such sides and ends descend below the under "surfaces of the arms. The sides, ends, and tops of these sheds "do not come in contact with the arms, but narrow spaces are "left between the inner surfaces of the sheds and the outer sur-"faces of those parts of the arms where such covering sheds are

"applied. The inner ends of the sheds are either open or par-"tially closed, and grooves or recesses are made all round the "arms where the inner ends of the covering sheds come; hence, "any rain or moisture which may fall on the other parts of the "arms beyond where the covering sheds are applied will be pre-"vented flowing or passing to the outer ends of the arms over "which the covering sheds are applied. When brackets are "used, and the outer ends thereof rise above the level of the "inner parts of the brackets, then the covering sheds come all "round the outermost ends of the brackets, but the sheds are "open at bottom. When the wires are supported by insulating "instruments or apparatus above the arms, then the bolts or "pins, on which the supporting insulators or instruments are "received, pass through the upper parts of the inverted sheds "into the arms, and such bolts or pins are coated with insulating "materials, or they are otherwise well insulated."

[Printed, 8*d*. Drawing.]

A.D. 1863, July 4.—N° 1668.

BONNEVILLE, HENRI ADRIEN (*a communication from Gustave Eugène Michel Gérard*).—"Improvements in the manufacture of "telegraphic wires, and in the apparatus connected therewith."

This invention consists in certain "processes for and means of "securing the complete isolation of the wires used for electric "telegraphs." "The wires, whether naked or already protected "by cotton, are covered with one or more coats of collodion." "The collodion may be rendered more or less supple by the addi-"tion of olaic" [oleic?] "acid, raw or boiled castor oil, or any "substance which may be mixed with it, such as common resin "or grease. For wires which require to be very thickly covered, "an envelope of galvanized" [vulcanized?] "india-rubber is "placed over the coating of collodion." "The india-rubber "envelope, pure or mixed with gum lac, is applied either by "means of the press used for covering telegraphic wires with "gutta percha, or what is preferable, by means of two small "fluted rollers, the flutes of which are worked perpendicularly to "their axes."

"By means of the above processes, wires may be obtained either "covered with one or more coats of collodion, so as to obtain an "envelope more or less thick; or wires covered in the first place

" with a coat of collodion, and then with cotton, simply wound " on or doubled and crossed, and afterwards again covered with " one or more coats of collodion, or coated with collodion and " then covered with an envelope of india-rubber, either pure or " mixed with gum lac. The contact of the india-rubber with the " wire may otherwise be prevented by tinning its surface, but the " coating of collodion is much preferable and less expensive."

[Printed, 4*d*. No Drawings.]

A.D. 1863, July 10.—N° 1732.

STILLE, LUDWIG.—(*Provisional Protection refused.*) " Improve- " ments in the construction and arrangement of galvanic bat- " teries, and in the utilization of products resulting therefrom."

The elements of the galvanic battery, which is the subject of this invention, are :—Carbon, nitric acid, chloride of potassium, and zinc. Gas coke, graphite, cast-iron, or platinum may be used instead of the carbon, and nitrate of potash may be employed instead of chloride of potassium. The porous vessel " is com- " posed of carbon or carbonaceous matter, or of charcoal and tan " moulded into a proper form, and then heated, so as to effect " carbonization."

An air-tight cover for the outer jar has an exit pipe for carrying off the gas given off during battery action.

" In the diaphragm a precipitate of busic-nitrate" [basic nitrate?] " of zinc or of busic-chloride" [basic chloride?] " of " zinc is formed, according to the fluid employed, whilst in the " outer jar there is a fluid containing nitric acid."

To utilize the products of the above-described arrangement, when nitrate of potash is employed in the porous vessel, the contents of the jar are mixed, and the " carbonate of zinc" is precipitated therefrom by means of carbonate of potash, and then " separated and prepared for use;" saltpetre is obtained from the solution by crystallization. When chloride of potassium is employed, " carbonate of zinc" is precipitated by means of carbonate of soda, and the nitrate of potash and chloride of sodium in solution are separated by crystallization. The gas given off during battery action is combined with air and passed into or over water, to regain the nitric acid.

[Printed, 4*d*. No Drawings.]

A.D. 1863, July 11.—N° 1733.

CHATTAWAY, Edwin Daniel.—" Improvements in railway " signals."

1st. " Adapting the cord and bell, or cord and whistle arrange-" ment or signal at present in use for enabling the guard of a " train to communicate with the engine driver, so as at the will " of the guard to convert such arrangement into an electro-" galvanic or electro-magnetic signal." " I enclose copper or " other suitable wire or wires properly insulated in the cord of the " arrangement before referred to, and connect the same by any " suitable means with a galvanic battery or magnetic apparatus " in the guard's van of a railway train. The wire or wires may be insulated by means " of gutta percha, india-rubber, or other suit-" able insulator."

2nd. " Constructing railway, semaphore, or other similar signals " of sheet iron, either coated or not coated with vitreous enamel, " or other similar material."

[Printed, 4*d*. No Drawings.]

A.D. 1863, July 15.—N° 1767.

FUNNELL, Edward.—" A self-acting electro-magnetic clock-" work signal for railway purposes."

" The principle of this invention is to indicate space blocked " or clear to the drivers of trains or engines, and also for every " engine or train to produce and discharge its own signalling, " and can be fixed at any required distances apart throughout the " line of railway.

" The mechanism consists principally of clockwork combined " with electricity, and is mounted on the top of a post or column, " and is furnished with an arm of suitable dimensions for the day " signalling, and a lenze by which transparent colors are dis-" displayed for night signalling on being illuminated; the me-" chanism is rewound by the first wheel of an engine or carriage " depressing a lever and locked, and are also connected alternately " by an electric attachment. On the passage of a train the arm " rises to an horizontal position, and displays red light simulta-" neously and remains thus charged, by which space blocked is " indicated, until the same train or engine arrives to the next or " a third signal, which will also be thus charged, by which the first

"or former are discharged, and the arm falls from an horizontal "to an oblique position, and displays green light simultaneously, "or at the lapse of an interval (as may be required), thus indica-"ting space clear between the one charged and the discharged, "and so on throughout any number employed, and the terminating "signal is discharged by a lever being placed at a suitable dis-"tance, which is depressed as before described."

The various clockworks are released by the falling of a lever on a stop, at the completion of the corresponding circuits (as explained above); the excited electro-magnet attracts its armature away from a stop, and thus allows the said lever to fall.

[Printed, 1s. 2d. Drawings.]

A.D. 1863, July 15.—N° 1772.

DUJARDIN, PIERRE ANTOINE JOSEPH.—"Improvements in "electric telegraphs."

This invention relates to improvements upon the printing telegraph set forth in N° 485 (A.D. 1860).

The "chief features" of this invention are as follows:—

1st. The length of the oscillations, in telegraphic relays, is increased by means of an "amplifier," or small lever into which the magnetic arm of the relay works.

2nd. A "translating relay," "printing relay," receiving coils and local battery are so arranged that the oscillations of "a single "relaying rod" suffices to work the printing apparatus.

3rd. The operation, by a single local battery, of the rotation of the type wheel, the printing electro-magnet, and the printing relay —a combination of currents, bobbins with one or two wires, two relays, and a "receiver," being used.

4th. The use of printing relays worked by a local current.

5th. The thin type wheel is fitted with a moveable shoulder, against which a helical spring that surrounds the axis, presses; this arrangement raises the type wheel after the blow is struck.

6th. "Inking the type or character a little before or after the "printing by means of a rotating pencil or inking plug."

7th. An "arrangement" "applied to all sorts of electric appa-"ratus, of two electro-magnets so disposed that the first after "attracting its pallet may transmit a part of the current by which "it is animated to the second one, which breaks the circuit of the "former, and remains animated so long as the contact is main-"tained."

8th. The type-wheel local current sent by the translating relay, after operating, partly traverses the coils of the printing electro-magnet.

9th. The drawing of the paper is effected by the printing gear.

The Provisional Specification sets forth an iron tubular core vibrating between poles of a permanent magnet, instead of the "single relaying rod" mentioned under the 3rd head.

[Printed, 1*s*. 6*d*. Drawings.]

A.D. 1863, July 15.—N° 1775.

BROOMAN, Richard Archibald (*a communication from Woldemar Stroubinsky*).—(*Provisional Protection only*.) "Improvements in apparatus for telegraphing by electricity."

"The object of this invention is to transmit two telegraphic "messages along the same line wire and in the same direction."

The invention is described "as applied to a Morse telegraph." Positive and negative electric currents act "upon different magnetic relays." "A revolving commutator, which, when the "circuit is closed, is capable of transmitting positive and negative "currents alternately," "is put into communication" with two manipulators at the sending station; "if one manipulator is closed, "a positive current passes; if the other is closed, a negative "current passes; and if both are closed, the two currents are "passed alternately. The receiving station contains two magnetic "relays, through which the telegraphic wire passes, each of "them being put in communication with a Morse instrument, "the two telegraphs will work separately and give different messages." To avoid diminishing the intensity of the dots received as signals, "a double relay" is employed "with three armatures," and the local batteries are made to "act continuously, their circuits being closed between the instruments by the relay armatures and their stops. The instruments will thus commence to "work with the breaking of the circuit at the relay, and will "continue to work as long as the armatures vibrate. The third "armature completes the work during the passage of the two "currents. With a similar arrangement complete lines may be "received for signals. In order to transmit the messages to succeeding stations it will suffice to use the same commutator. "The instruments well" [will?] "answer as usual for manipulators."

[Printed, 8*d*. Drawing.]

A.D. 1863, August 5.—N° 1931.

STORER, William, and HANCOCK, John.—(*Provisional Protection only.*) "Improvements in electro-motive engines."

"Our invention consists in constructing electro-motive engines "as hereafter described. In a suitable frame we fix a ring of "magnets which are charged with electricity from a battery in "the usual manner, inside this ring of magnets we fix a circular "rack or wheel with internal teeth. Upon a central shaft, to "which rotary motion is to be communicated, we fix four or more "arms, each of which carries a wheel with six armatures, more or "less free to revolve upon an axis, and upon this axis there is "also a toothed pinion gearing into the circular rack. Upon the "current being applied to the magnets in proper order the "armatures are attracted, revolve on their axes, and carry round "the arms and shaft to which they are connected. Power for any "purpose required may be taken from this shaft. In some cases "we keep the arms carrying the armatures stationary and drive "round the circular rack or wheel and take the power from it."

[Printed, 4*d*. No Drawings.]

A.D. 1863, August 6.—N° 1935.

GOWLAND, George.—(*Provisional Protection only.*) "Improvements in mariners' compasses."

"Instead of employing the ordinary fixed magnets placed "about the ships' compass, I employ one or more moveable "magnets so arranged that any change in the ship's magnetism "will be compensated for by a change in the compensating mag-"net. I prefer to place the compensating magnet in a line with "the keel of the ship or vessel either at the fore or after part of "the binnacle, and the same height as the compass in the binnacle "if required. Then suppose the ship's head is north and the "needle drawn to the west, the south pole of the needle would be "drawn to the starboard or right hand, but by placing the com-"pensating magnet at the after part of the binnacle, its south "pole would be drawn to the starboard, and its north pole would "then draw the south pole of the compass in the binnacle, and "thus correct it; but according to the amount of error in the "binnacle compass the magnet or magnets would have to be

" placed nearer to or further from it, and if required, I place one " or more magnets around the binnacle compass according to its " requirements, each magnet being free to move on its own centre " and not as heretofore fixed, thus obviating the errors arising " from the 'heeling over' of the ship or vessel. When using the " fixed magnet I allow it to dip by having it balanced on a pivot " or by having it arranged to float on any suitable fluid, thus ob- " viating with the ordinary magnets the errors arising from the " 'heeling over.' I prefer, where practicable to have the com- " pensating magnets on a line with the compass requiring com- " pensation, I also prefer to employ circular magnets for the pur- " pose of compensation."

[Printed, 4d. No Drawings.]

A.D. 1863, August 14.—N° 2007.

BRAE, ANDREW EDMUND.— (*Provisional Protection only.*) " Improved means of conducting electric currents through rail- " way trains, and of actuating signals or alarums therein."

1st. Making electrical connection between conductors on a railway train.—An India-rubber tube, containing a helical conducting wire, is fixed at one end to each carriage of the train, and at the other end to an iron pin or stopper. At the other end of the same carriage, in metallic connection with the stopper, is a socket containing mercury. The electric circuit throughout the train is completed by placing the stopper of one carriage into the socket of the next.

2nd. An electrical " alarm."—The lever bar of a steam whistle is connected directly with the armature of an electro-magnet in the above-mentioned circuit. When the circuit is broken, the bar falls and the whistle sounds.

3rd. " Contact breakers."—The above-mentioned mercurial junctions serve also as contact breakers. The pin is partially withdrawn from the socket by means of a check string attached to one arm of an " L-shaped crank;" the said crank, at the extremity of its horizontal arm, carries a ring through which the pin passes when it is placed in the socket.

" The series of conductors, as described in the first part of my " invention, is continued all round on both sides of the train, so " as to form a complete circuit of itself." The two parallel conductors, thus provided in every carriage, may be united " by a

"nippers" when it is desired to complete the circuit or to "form metallic connexion between the two parallel lines of "conductors at either side of the carriage."

[Printed, 4d. No Drawings.]

A.D. 1863, August 20.—N° 2073.

HAMMOND, CHARLES DANIEL.—"Improvements in apparatus "for the treatment of certain bodily ailments."

"My improved apparatus for the cure of certain bodily ail- "ments consists of a series of pieces of metal or other material "strung on elastic material in the form of a circle, which has at "the lower part of the circle a pad raised so as cause extra pres- "sure on a certain portion of the urethra and raphé. This ap- "paratus I apply for the cure of spermatorrhœa, specially also for "genital weakness and debility, and attach it to an ordinary "suspensory bandage, or it may be otherwise sustained by a belt "or other contrivance. To the belt I attach electric plates at "intervals to induce galvanic action. The apparatus consisting "of a series of pieces of metal before mentioned may be in "alternate pairs of electric plates; I term it self-adjusting cura- "tive apparatus. It is worn on the penis, which it encircles, and "exerts an elastic pressure thereon, the pad being at the bottom "part and pressing on the raphé as before mentioned, on either "side are two button knobs by which it is attached to a sus- "pensory belt or bandage worn round the body."

The plates of the apparatus "are arranged in pairs alternately "a zinc with a brass or copper plate, forming a voltaic pole" [pile?] "of slight power." The length of the elastic cords should be so regulated as to allow "the edges of the plates" "to touch "each other in order to induce the galvanic action." "On the "belt" the inventor applies "galvanic or metallic plates" "in "pairs." Three pairs are shown in the Drawings.

[Printed, 6d. Drawing.]

A.D. 1863, August 22.—N° 2088.

MOORE, SIEGMUND.—"Improvements in the means of and "apparatus for electro-plating, said apparatus being also applic- "able to medical purposes."

This invention consists "in interposing between the battery

" and the bath containing the object to be coated and the me-
" tallic solution an electro-magnetic apparatus or instrument
" which will give out both the direct, and the to and fro, or
" intermittent galvanic currents as may be desired. The appa-
" ratus is somewhat similar to the ordinary electro-magnetic
" apparatus wherein the coil of insulated wires surrounds a core
" and forms a hollow helix, the wires from the battery are to
" be connected by binding screws, to the primary wires of the
" coil, and the positive and negative poles of the direct current
" are to be connected to the bath, the negative pole being con-
" nected to the article to be plated, and the positive pole to the
" gold or silver plate in the bath."

The water regulator employed is the means of connecting a secondary wire to the above-mentioned primary coil. "The " to and fro or intermittent current is applied to medical pur-" poses by wires from the secondary bind screws."

From the description and Drawings, it appears that the interrupter is in the circuit which is completed by the electro-depositing bath, and not in the direct primary circuit extending from one battery pole to the other.

"The metallic solution should not be the ordinary cyanide " solution, as used at present, but I reserve to myself the use of " specially prepared solutions applicable to my invention." The deposit is rapid, "and as smooth as glass."

[Printed, 6*d*. Drawing.]

A.D. 1863, August 24.—N° 2098.

BROOMAN, Richard Archibald. (*a communication from Auguste Nicol Otto*).—" Improvements in air and gas engines."

" The up stroke of a piston is effected by the explosion within a " cylinder of a mixture of air and gas by an electric spark, while " the down stroke of another piston is performed by the pressure " of the atmosphere." A perforated piston having a hollow piston rod is placed inside a cylinder, another piston rod with a solid piston is fitted inside the hollow piston rod, the second and solid piston rod being free " to work up and down in the hollow " rod." The passages of the perforated piston are covered by a plate, and the said piston only descends to the air inlet port, " while the solid piston extends to the bottom of the cylinder," where the explosive mixture is admitted. When the perforated

piston is raised to the top of its stroke, the explosive mixture admitted below the solid piston, and air between the two pistons, the explosion drives the two pistons nearly into contact, the air passing off through the apertures in the upper piston; cooling then takes place, a vacuum is formed, the upper piston is thereby driven to the bottom of its course, and the solid piston falls (by its own weight) on the bottom of the cylinder. The expelled air rushes from the cylinder (which has a tight cover) into a suitable reservoir, from which it subsequently escapes.

In the cylinder near its bottom "there are two insulated wires " in connection with a galvanic battery;" one of these wires is connected to the engine, and the other to an insulated spring, with which a projection on the main shaft of the engine comes into contact at each revolution. When the said contact is made "an " electric spark is produced in the cylinder," "and the mixture " of air and gas is thereby exploded."

[Printed, 10*d*. Drawing.]

A.D. 1863, September 5.—N° 2190.

NORTON, William.—(*Provisional Protection only.*) "Im- " provements in laying and supporting submarine telegraph " cables."

This invention consists "in attaching buoys or other buoyant " supports by loops, chains, or otherwise to submarine telegraph " cables. The size and distance apart of the buoys or supports " must be regulated by the weight of the cable, and should be " such as will keep the cable in the still water between the upper " and the under current of the sea. The cable is thus protected " from injury by rubbing against rocks or the bottom of the sea, " and from the pressure of its own weight."

[Printed, 4*d*. No Drawings.]

A.D. 1863, September 5.—N° 2191.

MOODY, Thomas, and MOODY, Edward Toms.—(*Provisional Protection only.*) "Improvements in the generation and " production of motive power to be applied generally, and in its " special application to the propulsion of vessels."

The gases from the decomposition of water are used "as a " motive power," a magneto-electric apparatus being employed to decompose the water.

1st. The "generating apparatus."—A "Barker's mill" is situated concentrically to a number of permanent horseshoe magnets, the lower or cylindrical portion of the said mill having suitable valves which allow free ingress of the water contained in the space enclosed by the magnets into the said lower portion of the Barker's mill. An exploding chamber is level with the poles of the magnets, and a series of electro-magnets is mounted at the upper extremity of the mill, the electricity obtained from them being conducted to suitable "voltometers" [voltameters?] "where "it will be employed to decompose water or other fluid."

2nd. "Of the gases so evolved one portion goes to supply the "explosive chamber of the 'mill' with sufficient energy to "supply the place of the head of water usual to such reaction "engines, the other into a reservoir ready to be applied in the "production of motive power."

3rd. "In applying such power to the propulsion of vessels" each of several exploding apparatus communicates with a tube open at its extremity and running horizontally the whole length of the vessel. The chambers communicate with the above-mentioned reservoir, and each chamber has the means of recombining the gases introduced at intervals into it.

[Printed, 4d. No Drawings.]

A.D. 1863, September 5.—N° 2192.

ROWELL, JOSEPH.—"Improvements in the manufacture and "construction of fences, part of which are also applicable to the "manufacture and construction of gate posts, and to poles and "posts used for telegraph and signal purposes, and for stretching "telegraph wires."

"These improvements are partially based upon" N° 2516 (A.D. 1862); they are "applicable to the straining of telegraphic "wires and their poles or posts."

The "diagonal system of straining and strengthening sets of "wires or wire cords is also applicable to the straining and "strengthening of telegraph wires, the insulating of these being "effected by passing over their crossings eyes constructed of such "form and material as will prevent their contact, and more com- "pletely bind them together."

"Straining pillars having loose or detached bases," may be used as fence or gate posts and telegraph posts combined, "in "conjunction with angular or inclined stays and sockets."

"In making these improved forms of tapered standards of "malleable iron, whether short for fences, or long for telegraph "poles, or as a combination of both, it is preferred to roll them "through grooved rollers, but instead of the grooves being "concentric, annular, and parallel to the circumference of the "rollers, as for making parallel bar iron, they are made tapered "and eccentric to the roller, so that the iron rolled through "them will come out in the form of long bars undulating in "their thickness and width, which will have to be cross cut at "the centre of the broadest and narrowest parts where the repeat "of the form of the standard takes place."

[Printed, 1s. 4d. Drawing.]

A.D. 1863, September 15.—N° 2262.

THOMPSON, WARREN.—"Improvements in electric telegraph "apparatus."

This invention relates to a type-printing telegraph, worked by "continuously inverted currents of electricity." A white paper strip is impressed, by means of a roller and black paper strip.

The transmitting instrument consists of a circle of finger keys, concentric with an axis to which a tendency to rotate is constantly imparted by the action of a spring through a train of wheels. To each key there is a radial lever working on a fixed centre, and a wheel, on the before-mentioned axis, has as many slots and "lever stops" as there are levers or keys. On the depression of a key, the wheel is set free to revolve by the raising of the lever stop that has been last left in contact with a fixed pin; at the same time another lever stop is protruded so as to arrest the motion of the axis when it arrives at the fixed pin. During the rotation of the central axis an escape lever sends alternate currents into the telegraphic circuit.

In the receiving apparatus, two electro-magnets oscillate a bar magnet placed between them, and thus work the escape wheel of a clock train so as to rotate a type wheel; the said oscillation and rotation takes place upon the depression of a finger key and before the protruded "lever stop" has arrived at the fixed pin. The hollow axis of the type wheel is connected to the spindle by means of a spiral spring; a spring stop is placed at the zero position of an arm on the type wheel; a helical spring and sliding clutch, worked by a cam, connect the type wheel with its

spindle; an oscillating axis withdraws two pins—one after the other—from an arm on the cam axis. These arrangements allow of a roller to roll over the type, and of the revolution of the type wheel to zero after the letter is printed. The black paper travels slower than the white paper. An escape wheel on the type-wheel axis oscillates the contact apparatus of a relay.

[Printed, 2s. 2d. Drawings.]

A.D. 1863, September 16.—N° 2268.

RAHILL, JAMES.—" Improvements in liquid compasses."

" My invention consists in carrying up two or more hollow " tubes from the rim of the compass bowl, or from other con- " venient part thereof, and in uniting them to a hollow head " furnished at top with a screw or other stopper; communication " for liquid is established between the bowl and head, and the " head being on a higher level than the bowl any air that " might by any means be present would rise to the top of the " head. The head also affords a ready means of filling the bowl. " In some cases I do not unite the arms to the head, but carry " them up separately, and curve them over the compass so as " not to impede the full view of the card. Again in overhead " compasses, that is, those in which the card is seen from below, " I sometimes use a single central tube carried up from the top " or upper part of the bowl."

[Printed, 6d. Drawing.]

A.D. 1863, September 17.—N° 2285.

ULRICH, JOHN GOTTLIEB.—" Improvements in apparatus ap- " plied to railway carriages and trains in order to obtain greater " safety to passengers."

1st. Coupling the carriages to the locomotive engine.

2nd. Bringing the centres of the buffer heads to the " same " plane as the axles of the wheels of a railway carriage."

3rd. Suspending the bodies of a railway carriage.

4th. Electro-magnetic apparatus to enable passengers to communicate with the guard of a train.—"A handle is placed on each " carriage, which on being acted on or moved by a passenger, " becomes locked in the position to which it has been moved, and " at the same the movement of the handle couples up an electric

"circuit so as to cause an electro-magnet to move a screen so as "to indicate to the guard the carriage from which the signal has "been made, so that the guard may know at once to which "carriage to go." Each carriage has its own electric circuit and electro-magnetic apparatus, and is fitted with a number of pairs of wires to facilitate making the electrical connection with the guard's van. The Drawings show that the receiving instrument in the guard's van consists of a moveable keeper between the poles of two horseshoe electro-magnets; by the action of the apparatus this keeper is made to move or vibrate from a centre and, by a prolongation, to ring one of two bells; at the same time the said keeper removes a screen.

5th. A check or register against the engine driver which records continuously the speed at which the train is running.

[Printed, 1*s*. 8*d*. Drawings.]

A.D. 1863, September 18.—N° 2293.

DAVIES, George (*a communication from William Gerhardt*).—"Improvements in the manufacture of iron and steel, and in "apparatus to be employed in such manufacture."

1st. "Making cast steel."

2nd. "Certain apparatus" for making cast steel.

3rd. "Modified apparatus" for making fine cast steel.

4th. Constructing "furnaces for heating the crucibles."

5th. "Applying magnetism in the manufacture of steel:"—

"The molecular structure of steel will be altered by passing "through the same (while in a molten state in the moulding flask, "and before it has cooled) a current of magnetism." "When "steel (or any other substance susceptible to magnetic force) is "magnetized while cooling in the mould, the crystals wedge into "each other in the direction of the magnetic current and give to "the whole mass a longitudinal lamellar, tough, and strong tex- "ture. Another advantage also is that all lateral crystallization "is prevented by the action of the magnetic force which main- "tains the molecules of the crystals in a longitudinal direction." The galvanic battery and electro-magnet are mounted upon a truck; the branches or coiled poles are adjustable upon a vertical soft iron bar, and the line joining the poles is vertical; by this arrangement and by mounting the flask upon a block, the poles or "bars" of the electro-magnet are placed as near to their respective ends of the flask as possible. "The connection between the two

" bars being thus established by the flask, the magnetism generated " in the bars by the current of electricity passing through the " coils which surround them passes also through the molten steel " which lies within the circuit."

6th. Methods of introducing oxides of iron into molten iron.

7th. " A mode of ascertaining the quality of steel manu- " factured."

[Printed, 10d. Drawing.]

A.D. 1863, September 18.—N° 2295.

BAGGS, ISHAM.—" Improvements in the means of protecting " and preserving the hulls and bottoms of ships and vessels " from fouling and corrosion." Electricity is the means employed.

" For the purpose of preventing the hull or bottom of a ship " or vessel from fouling by the adhesion of barnacles, shell fish, " seaweed, and other substances, I employ, by preference, the " secondary current arising from an intensity coil."

" I place in any convenient part of the ship a powerful battery " hung in gymbals, the two poles of which battery are connected " at such times as are needed with the two extremities of the " primary coil. One end of the secondary coil is placed in per- " manent connection with the hull or bottom of the vessel to be " protected. The other end of the secondary coil is placed in " permanent or periodical contact with a conductor or conductors " properly disposed with regard to the hull of the ship so as to " distribute continuously, or from time to time as may be desired, " the shocks from the coil or battery over the surface of such " hull, and any other parts adjacent thereto, which may require " protection."

It is preferable " to concentrate the electric discharges upon " different portions of the hull in succession."

Another arrangement consists in shifting the conductor " from " place to place along the ship."

To preserve the hull of a vessel from corrosion, the negative pole of another battery is placed in permanent contact with the hull, and the positive pole is connected to the conductor or conductors hanging outside the hull in the sea water.

Zinc bolts, attached to the Muntz' metal sheathing, may be used in conjunction with the above-described plan.

[Printed, 8d. Drawing.]

A.D. 1863, September 21.—N° 2327.

RIDLEY, Robert, and JONES, James Grafton.—" Im-
" provements in apparatus for giving a reciprocating motion to
" picks and cutting tools used in getting coal and other minerals
" and stone."

" When using lever picks in combination with a suitable car-
" riage, electro-magnetic apparatus is applied to such carriage,
" and is connected and gives direct action to such picks. For
" these purposes any desired number of hollow electro-magnetic
" coils are fixed to a suitable bed plate or frame in a curved line
" struck from the centre of a central axis. On this central axis
" arms are keyed, and each arm carries at its outer end a bent or
" curved bar concentric with the central axis; this bar passes
" through one or more of the fixed electro-magnetic coils. The
" bent bar is composed partly of soft iron and partly of non-con-
" ducting material, so that when connection is made with a
" battery and an electric circuit is set up in a coil, one of the soft
" iron parts of the bent bar will be attracted by the coil so as to
" cause the non-conducting portion of the curved bar to pass out
" of the coil, whilst the soft iron part previously near the coil will
" be attracted to and pass partly into the coil, then on breaking
" contact in respect to the coil which has just acted, and making
" contact with the next coil a similar effect will be produced on
" another soft iron part of the curved bar, then the central axis
" will be caused to make a retrograde motion by another arm and
" curved bar being similarly acted on in an opposite direction by
" other electro-magnetic coils, and in this manner may a recipro-
" cating motion be communicated to a central axis, and from such
" central axis by means of a crank and connecting rod to the
" lever pick, and any desired number of arms, curved bars and
" electro-magnetic coils may be used according to the power
" required." Sliding picks may be employed, with straight bars and electro-magnetic coils. The Drawings also show an arrangement wherein the curved bars act from two centres.

[Printed, 1s. 4d. Drawings.]

A.D. 1863, September 21.—N° 2331.

DAFT, Thomas Barnabas.—" Improvements in the construc-
" tion of iron ships and vessels, and in sheathing the same."

"I construct iron ships or vessels with plates of iron of the "usual thickness and size, and upon the principle of what is "termed 'butt' or flush joints horizontally as well as vertically, "having strips or bands on the inside of the plates, and with a "double row of rivets or two double rows of rivets as is usual with "flush joints; but I do not allow the edges of the plates to touch "each other, on the contrary they must be kept a certain distance "apart," "for the purpose of being caulked or filled in between "and around the plates with strips of hard india-rubber *or other* "*suitable insulating material*, into which I bore holes if necessary, "and with suitable short nails fix on metal sheathing, taking care "to interpose a sheet or sheets of insulating material between the "metal sheathing and the iron plating of the ship or vessel." "Other modes of constructing or plating iron ships or vessels "may also be employed so long as grooves are produced on the "exterior of the vessel for the purpose of receiving insulating "material on to which to nail or fix metal sheathing."

"When the sheathing is of copper or yellow metal it will be "necessary to employ an insulating material between such metal "sheathing and the iron, and to use suitable nails or screws "accordingly, care being taken that they are all short enough to "escape touching the iron when driven into the caulking material "of the grooves. But if zinc be the sheathing employed, then as "zinc preserves iron there is no necessity for insulating it and no "danger in zinc nails touching the iron."

[This Specification is included amongst the electric series of inventions, as the prevention of electric contact between the sheathing and the iron of the vessel (both being in sea water), depends upon the practical application of electric science.]

[Printed, 4d. No Drawings.]

A.D. 1863, September 21.—N° 2332.

VON KANIG, WILHELM ADOLF.—(*Provisional Protection only*).

"Improvements in railway telegraphs and signals, and also "in the permanent way and carriages for preventing railway "accidents."

"This invention has for its object the prevention of railway "accidents, and consists, first, of a self-acting telegraph and "signals, by which the relative positions and progress of the "trains are indicated and regulated; secondly, of a train telegraph "and signals by which a means of communication is provided

"between all the carriages and the guards and engine drivers; "thirdly of a guard rail and guide wheel by which the trains "are prevented from running off the line; and, fourthly, of a "train guard or fender for removing impediments in front of the "trains."

"The trough or tube in which I fix the station and line appa-"ratus I also propose to use for containing *the ordinary electric* "*telegraph wires* for the transmission of electric or magnetic "telegrams."

[Printed, 4d. No Drawings.]

A.D. 1863, September 26.—Nº 2370.

CLARK, WILLIAM (*a communication from Théodore Courant*).— "An improved fabric for the production of permanent electricity "applicable for wearing apparel."

"This invention relates to the manufacture of an improved "fabric suitable for the production of permanent electricity. "This fabric has a warp consisting of carded wool forming the "surface, which is suitably arranged in the reed for completely "enveloping the metal wires in couples forming the weft of the "fabric. The warp thus formed has a thickness of wool on both "sides of the weft for the purpose of imparting softness to the "fabric and rendering it similar to flannel, without however pre-"venting the electricity produced by the couples from becoming "disengaged. The metal weft is composed of a core of cotton or "other fibre containing any suitable number of threads according "to the required diameter of the wires. The cotton core is first "chemically prepared in order to increase its conductibility, and "is then enveloped in a laminated covering or ribbon of zinc or "copper, a weft thread of zinc being placed beside a copper weft "in each shed of the warp in order to form a couple or voltaic "element."

The fibres of the above mentioned fabrics may be "of animal "or vegetable origin either woven or felted, under which latter "head I include paper." The paper is coated "with an adhesive "composition" on which the metals are fixed in the form of leaves, sheets, or powder, "the metals being of different kinds, "copper and zinc, for example, for producing electricity, after "which I make up the paper into garments or coverings to be "applied to the skin and caused to adhere thereto if desired."

[Printed, 4d. No Drawings.]

A.D. 1863, September 26.—N° 2373.

NORRIS, LUCIUS HENRY (*a communication from Lyman Holl*).—" Improvements in the manufacture of india-rubber and gutta " percha compounds."

" The invention consists in combining valcanized" [vulcanized?] " india-rubber waste with gutta percha and tar, and such manu- " facture may be further combined with such compound or " manufacture. Other ingredients, such as native india-rubber, " sulphur, lead, magnesia, chalk, also coloring and other matters, " according to the purposes to which the several manufactures " thus produced are to be applied, and some of such compounds " may be converted by heat in order to produce permanently " elastic articles or articles of what is known as vulcanite, ebonite, " or hard compounds of india-rubber and gutta percha."

" The original compound of gutta percha waste, vulcanized " india-rubber, and tar is applicable for various purposes, amongst " others to *the coating and insulating of telegraphic wires*, in which " vulcanizing is not necessary; but articles may be made of the " first mentioned or original compound, and subjected to heat " without additional sulphur, but it is generally preferred to add " a small quantity of sulphur."

" Articles of the original compound may be converted by the " process known as the cold process, using bi-sulphite" [bisul- " phide?] " of carbon, with or without bromine or chlorine."

[Printed, 4*d*. No Drawings.]

A.D. 1863, September 28.—N° 2376.

LOWE, THOMAS.—" An improved break for railway and other " carriages."

The apparatus is composed of " a spring bolt lever," " triangu- " lar lever," " toothed collar" on the axle, " pinion," " spindle," " toothed wheel," " central wheel," " vertical threaded shaft," " break band," and communicating wires. " The guard and driver " have each under their control a spring bolt lever working in a " notched quadrant; to these levers, the other ends of the wires " are connected. A bell is placed on each of these quadrants, " which is sounded on either wire being pulled."

" The action is as follows:—Upon the guard pulling the lever " in his compartment, the wire is caused to draw the upper leg of

"the triangular lever to one side of the apparatus whereby the "bolt is released, at the same time one of the lower legs with the "pinion is made to approach the toothed collar on the axle, into "the teeth of which it engages, the rotation of the axle and collar "causes the pinion and spindle to revolve with the toothed wheel "at its upper end, and also the central wheel, whereby the verti- "cal threaded shaft is lowered, and the break band or strap "applied. When the wire in the guard's compartment is acted "on, the bell near the driver is sounded, thereby giving him notice "to release his spring bolt lever. The same operations are "performed by the driver when he wishes to apply the breaks."

"*Electricity* may be substituted for the bell arrangements for "indicating the application of the breaks."

[Printed, 10*d*. Drawing.]

A.D. 1863, September 29.—N° 2386.

MULHOLLAND, Frederick George.—"Improvements in "the mode of manufacturing submarine telegraph cables, in ap- "paratus connected therewith, and in the method or principle of "laying same, and in the preparation of the several compounds "described for electric insulation and other purposes."

1st. The conductors are made of N° 14 Birmingham wire gauge, cleaned and passed through a composition containing shellac, naptha, and muriatic acid. Expansion or contraction is allowed for by over-lapping the ends of the wires, and taking round turns with each end "over the standing parts of the conductors."

2nd. The conductors are insulated by applying the above composition combined with caoutchouc and phosphorus to them; they are then over-lapped, passed through dies and vulcanized.

3rd. Any number of the prepared conductors are strained and imbedded in a composition containing vulcanized caoutchouc, resin, coal tar, shoddy, and phosphorus. The cable is then passed (in vacuo) through grooved rollers. N° 1950 (A.D. 1863) is referred to.

4th. The cable, constructed as aforesaid, is passed through a composition containing shellac, solution, caoutchouc solution, red lead, and phosphorus.

5th. The cable is braided with "green hide" in preference to wire.

6th. Whilst being payed out, the cable is passed through an arsenical solution or through " Stockholm tar and slush."

7th. Fans are introduced " for ventilation, and the mainten- " ance of an equable temperature for preservation of the cable " previous to submergence."

8th. The cable is delivered through a flat water-tight shaft near the vessel's centre of gravity. The head of the shaft is flexible and the said shaft has expansion joints. The strain of the cable is on the delivery rollers overhead.

[Printed, 6d. Drawing.]

A.D. 1863, September 29.—N° 2387.

MENDEL, SAM.—" Improvements in the manufacture of woven " fabrics applicable to covering telegraph wires."

" This invention consists of producing, in the process of " weaving woven fabrics, strips of cloth without selvedges for " the purpose of covering telegraph wires or " [for?] " insulating " purposes, which I accomplish by tackling the loom so as to " omit two or more warp threads at certain spaces or distances in " the reed and healds, thus leaving the fabric at those spaces to " consist of the weft alone, by which it is easily separated into " strips without selvedges, the selvedges having been found ob- " jectionable for insulating purposes on account of the uneven " surface they produce."

[Printed, 4d. No Drawings.]

A.D. 1863, October 2.—N° 2413.

LÜDEKE, JOHANN ERNST FRIEDRICH, and FISCHER, MAURICE.—(*Provisional Protection only.*) " Improvements in " obtaining motive power."

" Our invention consists in obtaining motive power by means " of a series of magnets placed in a vertical, horizontal, or any " other suitable position around a frame.

" On the circumference of a circular frame are placed a series " of magnets, some of which on the upper part incline inwards, " and the others outwards; but the lower part of the said mag- " nets are in the same line, some with the north pole to the left, " and the others in the opposite direction. Inside of the frame a " wheel provided with armatures revolves, which armatures as " they come in contact with the magnets close the current, whilst

"pieces of iron placed in a direction opposite to the south or "north pole of the magnets, and at some distance from them, "have the effect of putting in contact and breaking the current. "A vertical rod or arm is fixed to and moves round with the "said wheel, and carries with it one or more magnets. This arm "has a cross piece, from which descends another vertical arm, "also carrying one or more magnets. These magnets as they "move round with the wheel serve to renovate those fixed to the "frame; the outer ones renovating from north to south, and the "inner ones from south to north, or vice versa."

[Printed, 4d. No Drawings.]

A.D. 1863, October 10.—N° 2490.

GOUNDRY, John Wesley.—"Improvements in musical in- "struments."

Electro-motive power is applied to certain improved portions of keyboard instruments, thus "reducing the enharmonic system" (40 tones to the octave), "to the simplicity of the ordinary key- "board."

The "essential parts" of this invention are:—

1st. "Adding and changing lengths of wire to the circuit of a "single electric current by the motion of the parts" "through "which it is applied to actuate the pallets, levers, &c., in the "order corresponding to such motion."

2nd. "Causing a current to play only the extreme parts of a "harmony."

3rd. "Regulating the communication of compressed air to "pneumatic bellows by an electro-magnet."

4th. "Applying electro-magnets to the dampers and hammers "of pianofortes."

5th. "Adapting the enharmonic system to the ordinary key- "board by the use of electro-magnetism" "by means of" "slides, "barrel, or cross action, with their dissonance movements."

6th. "The application of electro-magnetism" to certain im- proved organ pallets.

7th. "The application of the single-current principle for adding "to and varying the combination of the stops."

8th. A "method of coupling ad libitum" in the working of organs, in which each row of keys is "provided with its own "coupler," "capable of coupling any other single row, or any "interval on another row of keys to its own keyboard."

9th. "The application of electro-magnetism to govern the "wind valves of the organ by a current from any keyboard, &c."

10th. A chain is applied to modulate and limit the combination of draw stops. The "tonic manuals" act on the chain, so as to make a kink in it by the depression of one manual at a time. The chain reaches from the highest manual to the lowest, "and so "much longer than this distance as to permit the descent of one "only at a time." "(This is an expedient already known in "telegraphy)."

[Printed, 1*s.* 6*d.* Drawings.]

A.D. 1863, October 17.—N° 2547.

DARLOW, WILLIAM, and LAWSON, ROBERT HENRY.—(*Provisional Protection only.*) "Improvements in apparatus or means "for obtaining motive power."

The main body of the apparatus consists of a hollow cylindrical vessel, supported on axes, "which acts as an alternating balance "lever." Certain compartmeuts in the said vessel are in connection with inclined tubes of the same capacity as their corresponding compartments. The compartments contain mercury and the tubes are furnished with pistons. The outer ends of the piston rods are connected with a rolling weight "supported upon a plat-"form moving on pivots attached to the apparatus."

"The apparatus is pulled over on its pivot" "to a certain "point," and the rolling weight "is moved so as to overbalance "the lever apparatus in one direction. The mercury then enters "the inclined tubes, the piston rods are forced outwards," and, by means of certain mechanism, they cause the weight "*to come* "*within the influence of an electro-magnet,* which by suitable "mechanism assists in carrying the weight over the centre and "thus overbalances the apparatus on its pivots" in the opposite direction to which it had been previously moved, into its original horizontal position, "where its downward movement is arrested "by a fixed stop or support." "The mercury then commences to "flow from the inclined chambers back again into the compart-"ments or reservoirs below, the pistons return to their former "position, tilting the platform and causing the rolling or travel-"ling weight to pass back again over the centre so as again to "actuate the apparatus or balance lever on its pivots or axes, and

"thus repeat the rocking or oscillating movements thereof in "continuous succession."

[Printed, 4d. No Drawings.]

A.D. 1863, October 17.—N° 2549.

MONCKTON, EDWARD HENRY CRADOCK.—"Improvements in "the means of uniting or joining plates or sheets of metal, which "invention is applicable to the construction of boilers, tubes, "and other useful purposes."

This invention consists:—

1st. "In a novel method of generating and applying heat to "the metal to be operated on."

2nd. "In the preparation of a suitable flux."

3rd. "In the method of uniting plates of metal so as to render "the join as strong as the plate itself."

4th. In making "indented and corrugated sheets of metal" "to overlay to be rivetted or brazed, or both."

Amongst the methods of carrying out the 3rd part of the invention, the following points involving applications of the electro-deposition of metals are mentioned:—"Iron and steel may be "galvanized or zinced, and other metals may be *electroplated* "prior to union by soldering, in order to insure certainty of a "clean surface and a perfect junction." "Immensely strong "tubes suitable for cannon may be constructed by having ribands "of steel or rolled iron or other metal *previously electroplated* or "otherwise well cleaned and dipped in the fluxion solution, and "dried, folded over, and prepared" for brazing.

The following points involve the prevention of galvanic action:—"Copper sheathing may be simultaneously soldered together, and secured to the bottom of an iron ship, thus rendering all access of sea water to the iron, and consequently all "*galvanic action*, impossible." "As the addition of the metals "to iron causes local *galvanic action* to a certain extent when "immersed in sea water in such cases (as in ship-building) the "iron to be united should be previously galvanized, which would "completely check the effect."

[Printed, 6d. No Drawings.]

A.D. 1863, October 26.—N° 2644.

BAGGS, ISHAM.—"Improvements in the means of and apparatus for paralysing, capturing, or killing fish, birds, and other

" animals." Electric force (however obtained) is used to carry out this invention.

1st. " Paralysing, capturing, and killing fish."—The two poles of a galvanic battery are brought into action in the water " in " such position as to include more or less the fish in the circuit." In angling with a hook and line, the fish " either receives the " shock direct, or by the tug he makes at the line, causes battery " contact to be made." In destroying whales the harpoon completes the circuit through the fish and the sea. In landing fish not thoroughly paralysed, a landing net in which polarized wires are woven is employed. " Geisler's " [Geissler's?] " exhausted " or vacuum tubes " may be employed to allure the fish.

2nd. " Paralysing, capturing, or killing birds and animals."—A bait is employed, and the conductors are so disposed " that the " discharge shall pass more or less through the body of the bird " or animal. Birds are thus made to perch upon the terminal " wires of a battery or coil, and animals are caused to tread upon " them or upon conductors attached to them." An arrow may be used to puncture the flesh and convey the shock at the same time. In slaughtering animals the shock is passed through the medulla oblongata.

3rd. " Destroying insects or vermin infesting trees or vegeta" tion."—" A continuous or intermittent repetition of discharges " from the electric coil " may be made in the immediate vicinity of the trees. Electricity may be thrown off " by brush, " glow, &c.," or the points of lightning conductors may be placed over the tree. " Objects of vegetation " may be subjected " to the effects of electricity transmitted through the soil." Some vermin may be destroyed in the same manner as ordinary fish, others may be killed or captured as described above for whales.

[Printed, 8*d*. Drawing.]

A.D. 1863, October 30.—N° 2682.

HAWORTH, John.—" Improvements in the improved me" thod of conveying electric signals and telegrams without the " intervention of any continuous artificial conductor."

This invention relates to certain improvements on the method described in N° 843 (A.D. 1862), also to certain new arrangements for effecting the above-mentioned object.

The apparatus being exactly similar at each of the terminal stations, it will be sufficient to describe that at one of the two stations.

Two upright cylindrically-convex plates are buried in the earth, one being a zinc plate and the other a copper plate; their convex sides are presented "towards the place to which it is "intended to send signals." Two upright copper cylinders are separate from each other and are buried. The convex plates are electrically connected to the terminals of a coil, also buried in the earth behind the said plates. The apparatus above the earth consists of a box containing three flat coils, a "condenser," another box containing two flat coils, a suitable galvanic battery, and "an ordinary telegraphic indicator." In the box of three coils, one outside coil is compound, each of its parts being of iron wire and wound in opposite directions; the other outside coil is of fine copper wire; each of the outside coils have their terminals connected; the middle coil is of thicker copper wire and has its ends free. The "condenser" consists of two rectangular compartments, each of which is filled with a series of gutta percha plates wound with insulated wire; there are also certain insulated bands of gold foil, the terminals of which are respectively connected with the battery and the copper cylinders. The battery is also connected with the indicating instrument, and thence with the middle coil in the box of three coils; the said coil is also connected to the convex plates. The coils of the "condenser" are electrically connected with one of the coils in the box of two coils. The middle coil in the box of three coils and certain coils in the "condenser," are also electrically connected.

[Printed, 3s. 4d. Drawings.]

A.D. 1863, November 6.—N° 2763.

JOHNSON, Richard.—"Improvements in testing the strength "of wire for telegraphic and other purposes."

This invention consists "in testing the strength of wire by "passing it over surfaces, one of which is caused to draw it "forward at an accelerated rate."

Spur gear is used to drive two drums, one of which rotates at a quicker rate than the other. The reel upon which the wire to be tested is placed is carried by a stud projecting from the framework.

The operation is as follows:—The end of the wire from the reel is conducted to the first or slow-moving drum, "around the "circumference of which it is coiled several times;" it is then conducted to gripping jaws upon the quick-moving drum. Motive power being now applied, the gearing will cause the two drums to revolve and to draw the wire off the reel, winding it upon the quick-moving drum. Every length which is taken up by the quick-moving drum will "become strained and submitted "to a test by which its strength is ascertained, which test may "of course be increased or decreased at pleasure, by varying the "relative surface speeds of the two drums."

In the arrangement shown in the Drawings, the slow-moving drum "is driven through the medium of a clutch box." By this arrangement the inventor is enabled to disconnect the slow-moving drum "from the other parts of the machine, and to turn "it by hand on the commencement of the operation, so as to "start with the wire in a strained condition." The whole length of the wire having been tested, the jaws are loosened and the coil removed from the quick-moving drum.

[Printed, 8d. Drawing.]

A.D. 1863, November 13.—N° 2826.

SIEMENS, Charles William (*partly a communication from Werner Siemens*).—(*Provisional Protection only.*) "Improvements "in apparatus for submerging submarine telegraph cables."

The object of this invention is to obviate the changes of torsional action to which the cable is subjected in the ordinary method of coiling the said cable.

In submerging specifically light cables in deep seas, the cable is wound upon a drum that is mounted upon a vertical spindle, which is connected (by means of gearing) to a steam engine, the "principal duty of which is to impart rotary motion to the cable "drum in the proportion as such propelling force is needed." "The cable passes from the drum over proper guide rollers into "the sea." A dynamometer, consisting of fixed and moveable pulleys, together with suitable springs, provides "a certain "amount of cable under a determined tension between the heavy "reel or drum and the sea," and is connected with the regulating valve of the steam engine; "a nearly uniform tension of "the cable is thus maintained."

A brake wheel is used in paying out heavy cables. A counter to show the length of cable laid, and another, connected to a log by electrical step-by-step mechanism, may be used to determine the amount of slack or to regulate the amount of cable payed out. A retarding hydraulic cylinder and piston is applied to the brake.

In paying out a heavy cable a stationary drum may be used, and it may be uncoiled "by means of a hollow arm or pen-"dulum."

If the upper flange of the stationary drum is provided "with a "smooth rounded edge," "the pendulum lever may be dispensed "with."

In either of the stationary drum arrangements, a steam engine is connected "to the regulating wheel over which the cable has "in these cases to pass."

[Printed, 4*d*. No Drawings.]

A.D. 1863, November 16.—N° 2874.

HARRISON, Charles Weightman.—"Improvements in "filters."

1st. "Forming filtering layers or beds of asbestos, talc, and "other similar fibrous or laminar minerals, either alone or com-"bined with mineralised wool, sponge, or carbon."

2nd. "The adaptation to filters of one or more cast-iron or "steel permanent magnets or electro-magnets, or helices of con-"ducting wire. These are placed in any convenient position for "acting upon or polarising the oxygen in the water or other "liquid to be purified."

3rd. Constructing filters so "that they may float at or just "below the surface of the water."

"I construct my filters of a cylindrical or other shaped cage "closed at bottom, and at top by a movable cover. The cage "itself is formed of wire cloth or perforated metal, and encloses "within it another openwork cylinder; inside this cylinder, and "in the centre of the filter, is a perforated pipe leading into a "solid pipe passing through the bottom of the filter, from which "the filtered liquid is taken. The space between the two open-"work cylinders is packed with sponge, felt, fibrous substance, "or other coarse filtering material, such, for instance, as washed "gravel, while the space between the inner cylinder and the per-

" forated pipe for receiving the filtered liquid is filled with silicated " carbon, animal charcoal, or other carbonaceous matter. A " cover in the form of an air vessel is applied on the cylinders to " give the filter sufficient buoyancy at or just below the surface of " the liquid. This air vessel cover is capable of ready removal " to allow of the cleansing of the filtering materials when neces- " sary."

[Printed 6d. Drawing.]

A.D. 1863, November 18.—N° 2893.

JENNINGS, JOSIAH GEORGE, and LAVATER, MANUEL LEOPOLD JONAS.—" Improvements in the manufacture of tubes, " rings, and cords of India-rubber, and in covering telegraph " wires."

To obtain strips of India-rubber of a certain width and with bevilled edges suitable for the manufacture of India-rubber tubes, they are cut from a block " by means of a knive or knives " either rotating or oscillatory, and so placed as to cut at an " inclination (by preference at an angle of 45°) to the parallel " sides of the block." " The bevilled edges of the tapes or strips " are not produced by the knives or cutters, but are obtained from " parallel sides of a block, the knife being caused to cut at an " angle to these sides." Coloured strips or tubes may be made by means of particoloured blocks.

" Strips with bevilled edges, obtained by cutting a block in the " manner above described, we also employ in covering telegraph " wire, and such strips we lap spirally around the wire or other- " wise."

" Elastic bands or rings of india-rubber may be produced by " cutting off slices of the thickness desired for the band or ring " from tubes made with strips cut from particolored blocks as " just described." " In order to cut the tubes into strips or " bands, the tubes are by preference placed on a mandril and put " into a lathe, the rings are then cut off the tubes as is now " commonly practised."

To produce " a cord of india-rubber suitable to be used as a " spring," " we cut a band of suitable substance, and square in " section, and pass this when very plastic through rollers which " press down the angles, and immediately we freeze the band so

"as to set it in the round form into which it has been pressed." "A band so made when thawed and vulcanized will retain its "round form."

[Printed, 4d. No Drawings.]

A.D. 1863, December 1.—N° 3006.

WILDE, Henry.—"Improvements in the construction and "working of electric telegraphs, and in apparatus connected there-"with, partly applicable to other purposes."

1st. "Constructing and laying subterranean telegraph wires."—Groups of thick insulated iron wires are cut into convenient lengths and placed in the interior of iron pipes. The groups are supported and separated from one another and from the sides of the pipes by means of perforated earthenware cylinders. The wires are joined by means of short slit tubes, the joints being soldered. Water-tight chambers, having their covers level with the road, are used to connect and divert the various telegraph wires that meet at the intersection of streets. As the pipes are inclined and syphons are placed at certain intervals, they cannot be flooded, even if broken.

2nd. "Establishing telegraphic communication between the "various parts of cities."—The telegraph wires form a polygon which surrounds the city, and the various parts of the city are connected by wires, which, by their intersections form a series of quadrangles; there is thus no necessity to dig up the roadway.

3rd. "Making a single telegraph wire available for a number "of stations situated at each end of the wire without communi-"cating with any other station but the one where the intelligence "is required."—By means of a series of cams that revolve synchronously with particular arbors of clocks at the terminal stations, the main telegraph wire is placed in connection with each of the branches for a definite time.

4th. Using the magneto-electric machine set forth in N° 516 (A.D. 1863), to give audible signals through an uninsulated cable and its uninsulated return cable. — A small magneto-electric machine is used to excite the magnets of the large machine; either of these machines may be used for producing the electric light. The uninsulated cables are described in N° 2997 (A.D. 1861).

[Printed 1s. 6d. Drawings.]

A.D. 1863, December 1.—N° 3012.

REDMAN, JESSE GUSTAVUS, and MARTIN, GEORGE.—" Im-
" provements in compounds or compositions for coating or cover-
" ing iron or wooden ships and vessels, metallic sheathing, *tele-*
" *graph cables*, and other objects, to preserve them from decay,
" fouling, or other destructive action."

We take oxidized brass, or protoxide of copper ground in " water and afterwards dried, oxide of zinc or alumina, and oxide " of lead, and then boil them in vegetable pitch or a mixture of " vegetable pitch and mineral pitch, vegetable tar, or a mixture " of vegetable tar and mineral tar, or vegetable tar and rosin, or " rosin oil and vegetable tar, until the pitch, tar, rosin oil, and " oxides are oxidized and oxidated, and a quick drying metallic " varnish is formed. The metallic varnish may be thinned for " use by rectified mineral naptha, petroleum spirit, or any other " cheap spirits, and to every fourteen gallons of the varnish we " add one quart of puro carbolic acid."

When the above described varnish, or any modification of it, is used for covering iron, " two or more protective coats should " be applied, which may consist of pitch, or pitch and asphalte " varnish."

A " protective varnish paint " contains oxide of zinc, peroxide of manganese, rosin oil, rosin, and linseed oil; " we thoroughly " mix the above ingredients and boil them together for a suffi- " ciently long period until they become suspended in the form of " a paint or varnish, and we then thin the composition with " petroleum spirit or rectified mineral naptha." This " pro- " tective varnish paint " is only mentioned in the Final Speci- fication.

[Printed, 4*d*. No Drawings.]

A.D. 1863, December 8.—N° 3096.

HENRY, MICHAEL (*a communication from Charles Joseph Louis Meynard*).—" Improvements in apparatus for regulating the pas-
" sage of aeriform and other fluids."

This invention consists in employing, for the above purpose, " apparatus worked by electric, electro-magnetic, voltaic, or gal- " vanic agency," which apparatus acts on a valve or other con- trivance for opening and closing "the way through which the

" fluid passes and is itself acted on by the making and breaking of electric contact produced "by the variation of pressure, tem-" perature" or other effect to be regulated.

To control the passage of steam, for instance, conducting wires are placed in a mercurial pressure gauge at any desired level of the mercury; when the mercury rises so as to make electric contact between the terminals of the conducting wires, an electro-magnet in the circuit acts upon the regulating apparatus and closes or tends to close the throttle valve. " In one arrangement " for the purpose a sliding frame or plate carries an electro-magnet " and a beam or lever, on which are two drivers and an arma-" ture;" these drivers "turn ratchet wheels in opposite direc-" tions; such wheels are on an axis in gear with the spindle of a " throttle valve, and only one driver is in gear at one time, so " that, according as to which is engaged, the direction of motion " of the axis and hence that of the valve will be varied." When the electro-magnet is active one of the drivers is lifted out of gear with its wheel and the driver in gear tends to close the valve; the valve is opened by similar means applied to the other driver when the electro-magnet is inactive. " A centrifugal governor may be " adapted for the purpose of the invention." " A like arrange-" ment may be applied to water wheels."

[Printed, 8d. Drawing.]

A.D. 1863, December 9.—N° 3107.

MORGAN, THOMAS VAUGHAN.—" Improvements in the treat-" ment and purification of plumbago for the manufacture of " crucibles and other fireproof articles, and in apparatus employed " therein."

The impurities to be removed are iron and lime and their compounds.

To remove the iron and its compounds, the compounds are first converted into " a magnetic protocarbide of iron " by heating the pulverised impure plumbago to a low red heat in a retort, the said magnetic protocarbide is then withdrawn " by magnetic or " electro-magnetic action." "The arrangement of apparatus " which I employ for effecting this object is formed by placing an " endless band of cloth of any required dimensions upon two " rollers, which work horizontally together, or nearly so, over " this endless band, and near one one of its rollers a hopper is

"fixed, into which the granular plumbago is placed, whence it "passes through a narrow opening at the bottom in a thin "layer upon the moving endless band. Close above this one or "more endless chains of magnets are carried upon drums; these "magnets attract the magnetic impurities and carry them into "receivers placed on each side of the endless band, the pure "plumbago passing onward with the band over one of the drums, "falls into its receiver." In the chain a small brass link is used to separate the opposite but adjacent magnetic poles. Electro-magnets may be used instead of permanent magnets.

The iron may be converted into chloride by passing chlorine through the red hot impure granular plumbago; the said chloride is "then washed away with water."

Sulphate of lime is converted into sulphuret and eliminated by means of water. Carbonate of lime is converted into chloride by means of hydrochloric acid, and the soluble salt washed away.

[Printed, 10*d*. Drawing.]

A.D. 1863, December 14.—N° 3151.

BAILEY, JOHN AYLESWORTH, and SPEED, JOHN JAMES.—(*Provisional Protection only.*) "A new and improved mode or "process of covering or insulating wire for telegraphic and other "uses or purposes with twine, cordage, and other covering of a "like character."

The characteristic of this invention is "the compressing of the "covering about and upon the wire, so as to envelope it in a "covering which shall be impervious to moisture for at least a "very considerable length of time. Single wires thus covered "may also be made into a cable, and then such cable be wound "and compressed in the same manner."

The twine is saturated with a non-conducting substance, then wound upon the wire, and compressed upon the said wire by means of suitable mechanism; two or more compressed coverings can be given in like manner.

The winding and compressing mechanism consists of two tubes, through which the wire passes; one of these tubes is stationary, and the other revolves round the wire. The diameter of the fixed tube suits the thickness of the completed wire, and that of the revolving tube the thickness of the wire before it is covered. The end of the revolving tube has a flat face, and is "conically shaped,

"so as to fit within the expanded mouth of the other tube." The revolving tube "both winds the cord or twine around the "wire, and at the same time with its face or flat end com- "presses the twine as it is wound." The winding and compressing action of this apparatus moves the wire along; "the "degree of compactness to be given to the covering is thus "governed by the motion allowed to the wire."

[Printed, 4d. No Drawings.]

A.D. 1863, December 19.—N° 3208.

GISBORNE, Frederic Newton. — "Improvements in the "means of communicating signals on board ship, on railways, "and for other purposes."

A mechanical receiving apparatus is described and shown, in which a wire cord from the sending apparatus passes over a pulley mounted on the extremity of a cam shaft; the cams are so placed on the shaft that a particular amount of rotation imparted to the said shaft causes a particular cam to act upon the lever of particular shutter, and thus to expose the desired signal. The sending apparatus has a similar pulley, round which the other extremity of the wire cord is wound; a handle or pointer is fixed on the pulley axis, and moves over a fixed dial plate. A bell arrangement upon a similar principle is also set forth.

The raising of the desired shutter may be accomplished by means of an electro-magnet and armature, instead of by the above-described mechanical movement. One electro-magnet opens "two shutters alternately at pleasure," "two small permanent "magnets" being fixed on the shutter levers "in such manner "that their two north poles are over either end of the electro- "magnet. By a well-known rule or law of magnetism, either "one permanent magnet is attracted or repelled, according as the "current transmitted through the electro-magnet is positive or "negative."

A mechanical arrangement, in which the bell is rung prior to the movement of shutters, is also set forth.

A shaft of octagonal cross section may be revolved by steps according to the signal to be exposed, the signals being inscribed on the longitudinal facets; the pulley and wire cord are employed to revolve the octagonal shaft.

[Printed, 1s. 4d. Drawings.]

A.D. 1863, December 23.—N° 3252.

WALTON, Frederick. — "Improvements in telegraphic "cables."

"In order to insulate the conducting wire of the cable, the "insulating material is formed by forcing it through dies into "cords or strings." "These cords or strings are as they issue "from the die conducted i wards and laid on to the wire or "conductor, around which they form a complete cylinder, the "orifices of the die being of such a shape as to cause them to do "so; the insulator is consolidated around the conductor by "pressing rollers." The conductor, thus insulated, is then immersed in water and wound on a roller. The insulating material contains oxidized oil, shellac, resin, and highly pulverized silica or glass.

The insulated conductor is inclosed in a semi-rigid tube, composed of strips longitudinally laid. The strips are cut from a fabric, and are coated with a composition containing oxidized oil, Kaurie gum, ground glass, sugar of lead or oxide of zinc, and coal naphtha; the said strips are made to overlap, and are squeezed tightly down on to the insulated conductor by means of rollers.

Instead of applying "protecting wires, circular in section "spirally around the cable core, in order to protect it from injury," the inventor employs "protecting wires or rods of metal hollowed "out on two opposite sides and conveniently flat on the other "sides, the wires or rods are applied spirally, as heretofore, and so that one of the flat sides comes in contact with the core, and "between the wires there is at the same time laid in a yarn "saturated with tar or composition." The cable then passes through rollers, "and almost immediately the cable escapes from "the nip of the rollers it should be served around with strands "of hemp or with wire."

Over the protecting wires and the serving a coating is applied, which contains oxidized oil, resin, ground silica, and arsenical salts. The ground silica is said to enable the coating "to resist "the attacks of marine creatures."

[Printed, 6d. Drawing.]

1864.

A.D. 1864, January 11.—N° 72.

BONNEVILLE, Henri Adrien (*a communication from Edouard Estienne*).—(*Provisional Protection only.*) "Improvements in cer-"tain telegraphic apparatus."

The roller "on which the strips of paper are wound after "receiving the telegraphic writing" "is according to the im-"proved principle composed of two openworked discs," "sepa-"rated at the centre by a wooden washer," "fixed to one of "the discs," "through which passes a muffle" "and a spring "catch," "all fixed to the same disc." "On the side of the "washer opposite to the spring is cut a slot," "which is filled "by a pin" "attached to the other disc," "when the two are "brought together. The second disc" "is provided with a "sheath" slit parallel to its axis, "which slides over the washer" "with the pin" "above mentioned, and with a slot," "in which "the spring catch" "enters." To the second disc "a projecting "centre piece" "is adapted, which serves for taking it off or "putting the apparatus together. The end of the strip of paper "being passed in by one slit and out by the other is held firmly "on the roller without the use of gum."

The roller for feeding the paper before it receives the telegraphic writing "differs from the former inasmuch as the muffle" "through which the axle passes, is square from the extremity of "the washer." "On each side of this muffle a groove" "is "made which receives a spring catch" "fixed to the opposite "disc."

[Printed, 6*d*. Drawing.]

A.D. 1864, January 15.—N° 112.

HENERY, Alfred Field.—"An improved galvanic belt."

The "galvanic belt" is applied to the human body for the treatment of various disorders "to which electricity is ordinarily "applied."

The belt has a leathern portion and a continuation of silk, which is fastened by a buckle and carries the discs (of copper and zinc respectively) that form the poles of the arrangement. A piece of India-rubber or elastic webbing is let into the silken

portion of the belt "to afford ease to the wearer." To the leathern portion of the belt "are attached by eyelets the series "of thin plates of copper and zinc, or other metals capable of "forming a voltaic pile or series, between each pair of plates a layer of leather, felt, cloth, or other suitable soft material is to intervene."

The terminations of the voltaic series are connected to the above-mentioned discs by means of "fine wire spiral springs."

Below that part of the belt which carries the elastic webbing a "suspensary bag" may be attached, in which "a series of small "metallic plates may be arranged, connected with the two discs "by conducting wires."

When the belt is only used temporarily, the absorbent material between the plates should be moistened.

In this apparatus "electricity is applied to the human body by "contact with the discs," thus "forming a self restorer and "regenerator."

[Printed, 8d. Drawing.]

A.D. 1864, January 16.—N° 120.

BURR, DAVID AUGÛSTE (*a communication from George Stearns*).—"Improvements in lightning arresters for protecting electric "telegraph apparatus."

"These improvements relate chiefly to the employment of "charcoal, powdered glass, powdered sulphur, powdered amber, "or their equivalents as electric conductors for separating and "discharging atmospheric electricity from the wire circuits of "telegraphic lines."

The Final Specification describes and the Drawings show an apparatus suited to two line wires. Within the wooden frame of the "arrester or paratonnerre" the charcoal, or other partially conducting substance, is placed, between two upper metallic plates and one lower metallic plate. The upper plates are connected to the line wires, and the lower plate is connected to the earth. The recording instruments are also attached to the upper plates by means of fine platinum wires.

The action of the instrument is as follows:—The line-wire current passes across the upper plate to the recording instrument by means of the fine platinum wire. A current of atmospheric electricity arriving at the upper plate is obstructed by the fine platinum wire and finds a free passage across the charcoal to the

earth. The platinum wires, which would otherwise be melted, are thus protected from harm.

Another paratonnerre is illustrated, which has "but one cavity "for the intermediate charcoal filling."

[Printed, 8*d*. Drawing.]

A.D. 1864, January 21.—N° 169.

RITCHIE, Frederick James.—"Improvements in the appli- "cation of magneto-electricity to the propelling and controlling "of sympathetic clocks."

The alternate currents or shocks from a magneto-electric machine are changed into currents of one kind by a "current "changer" on the axis of the revolving armature. Attached to the framework of the normal clock, and worked by the teeth of the escape wheel, is also a "current changer," which passes "an "alternate stream of positive and negative currents, continuing "very nearly an entire second of time," to the electro-magnets of the sympathetic clocks. By this means permanent magnets are made to oscillate in the sympathetic clocks, and thus to impel their wheelwork at regulated intervals of time.

In large sized clocks the wheelwork is propelled "in the ordi- "nary manner by means of a main spring or weights wound up "at intervals," but, instead of using a pendulum, the escapement is unlocked by means of the vibratory motion of the magnets.

In the magneto-electric machine, two out of the four bobbins employed are placed upon each pole, and a soft iron armature revolves before the poles.

The clockwork operating the magneto-electric machine is liberated at suitable intervals by means of a "Denison's gravity "escapement."

In the current changers flat conducting springs are employed, in connection either with cams or with the teeth of the escape wheel.

[Printed, 1*s*. Drawing.]

A.D. 1864, February 29.—N° 497.

WEIL, Frederic.—"Improvements in coating metals with one "or several other metals, and in oxydizing the surface of these "latter."

The metallic articles are immersed "in an alkaline solution "containing, simultaneously with a large excess of a fixed "caustic alkali, a salt of the metal, which is to form the coat, "and containing tartaric acid, glycerine, or any other suitable "matter preventing the precipitation of the oxide of the said "metal." The solutions may be used to coat by mere immersion of the articles therein; the effect of this immersion may be increased by keeping the metal to be coated, whilst immersed in the solution, in contact with metallic zinc; or a galvanic battery may be used in connection with the said articles and solutions.

In a coppering solution double tartrates of copper and an alkali are the salts of copper employed. When coppering solutions are used for bronzing and colouring metals previously coppered, they must contain a larger proportional quantity of the salt of copper.

The coppering solution may be used to bronze or colour wrought or cast iron, the articles being kept in contact with metallic zinc during the operation; "probably a galvanic action "hereby takes place."

Bronzing and colouring brass and other cupreous alloys is effected by the first-mentioned copper solution.

A solution for silvering previously coppered articles is formed by means of nitrate of silver, tartaric acid, ammonia, and cyanide of potassium.

[Printed, *6d.* No Drawings.]

A.D. 1864, March 12.—N° 637.

NEEDHAM, FREDERICK HOTHAM.—(*Provisional Protection only.*) "Improvements in electric telegraph cables or wires for "submarine, subterranean, or overground purposes."

The inventor proposes to insulate the above-mentioned wires "by means of an oxidized surface."

"In addition to such oxidated surface, I should propose for "submarine wires to apply thereto a deposit of saline earthy sub-"stances similar to those contained in the sea, such deposit to be "formed in combination with the oxidation or subsequently thereto. The oxidised surface may be caused very readily by "means of immersion in diluted acids;" or the oxides of other metals or alloys "may be made to adhere to the surface of the "copper-conducting wire oxidized or in a bright state.

"A comminuted or powdered leaden surface may be applied to "the copper, or an oxide of lead;" by using this method "the "wire would ultimately become imbedded in a thick line of "insulating deposit. The powdered mineral or oxide might be "mingled with some adhesive materials." "For submarine "wires it would be necessary to strengthen them with a fibrous "material."

"Wires for land telegraphs would not require to be treated "with saline earths, although in some cases I should propose to "apply a coating of pulverised earthy substances or solutions."

[Printed, 4d. No Drawings.]

A.D. 1864, March 16.—N° 680.

VON KANIG, WILHELM ADOLF.—"Improvements in railway "telegraphs and signals, and also in the permanent way and "carriages for preventing railway accidents."

"This invention has for its object the prevention of railway "accidents, and consists, first, in a self-acting telegraph and "signals, by which the relative positions and progress of the "trains are indicated and regulated; secondly, by a train tele-"graph and signals, by which a means of communication is "provided between all the carriages and the guards and engine "drivers; thirdly of a guard rail and guide wheel, by which the "trains are prevented from running off the line; and, fourthly, "of a train guard or fender for removing impediments in front "of the trains."

The first portion of the invention consists of a telegraph operating in sections, between post and post, by means of mechanical arrangements. "I further propose that this sectional tele-"graphic apparatus shall also be used as a means of telegraphing "through from station to station, and in order to render it "available for the latter purpose the sectional wires are mounted "upon 'isolators,' and these ends are connected at each post, so "that if a train should break down, or in any other case of need, "the guard could by a portable battery send a message to either "or both stations before and behind the train. And I further "also propose to use the tube or pipe connecting the line sec-"tional telegraph wires for containing and protecting the ordinary "electrical telegraph wires."

[Printed, 1s. 6d. Drawings.]

A.D. 1864, March 29.—N° 781.

ARTHUR, William.—(*Provisional Protection only.*) "An im-
"provement in compasses."

"The object of my invention is to make a compass register
"the courses steered by a vessel during any given period. For
"this purpose I suspend a cylinder on a needle or axis at both
"ends from the deck by cup-and-ball columns and gimbals.
"The cylinder has three or more magnetized needles passed
"through the shaft to which it is secured. I make a pencil
"descend by clockwork, and register on a piece of paper wrapped
"round the cylinder the courses steered."

The Drawings show a box containing the clockwork at the base of the apparatus. "The pencil is held in a socket" "in a frame," "and is caused to strike against or come in contact with the "paper on the cylinder" "at regular intervals by the projections "on a ribbed roller" "(which is made to revolve by the clock-"work) coming against a projection on one end of an arm" "forming part of the frame;" "at other times the pencil is kept "from contact with the paper by a spring." "The frame carry-"ing the pencil is mounted on a threaded rod," "caused to "rotate by the clockwork, whereby the pencil is made to "descend gradually from top to bottom of the cylinder. In-"stead of being mounted on the rod" "the pencil may be "secured to a band passing over rollers, one of which is caused "to rotate by the clockwork."

[Printed, 10*d*. Drawings.]

A.D. 1864, April 2.—N° 833.

NEWTON, William Edward (*a communication from Adrien Holtzman*).—"Improvements in electric or telegraphic con-
"ductors."

The object of this invention "is to perfectly insulate the wires, "and to so arrange them that several may be combined together "in a tube or pipe, so that they may be placed under ground. "The wires are enclosed in a cast or wrought iron tube of suitable "diameter according to the number of wires, and care being "taken that the wires are kept from touching each other or the "sides of the tube, the latter is filled with liquid pitch, or what "the inventor terms 'liquid brai,' which is obtained by distilling

" gas tar." "It becomes liquid at about 200° Fahrenheit, and if
" forced into the enveloping tubes with moderate pressure will
" firmly envelope the wires."

" The lengths of the tube are formed with butt joints, which
" are connected together and secured from wet by means of thin
" curved metallic plates and short tubes, discs, or rings, of gutta
" percha or other suitable waterproof material, the whole being
" secured by a metal bridle-piece or clamping band, which is
" tightened up by means of tightening screws."

" The electric or telegraphic conductors, insulated and pro-
" tected in this manner, may be placed either above or below
" ground, but the invention is intended more particularly for
" underground conductors."

[Printed, 8*d*. Drawing.]

A.D. 1864, April 9.—N° 893.

SIMPSON, John Hawkins.—" Certain improvements in print-
" ing from type by electricity."

This invention "has for its object and purport to effect the
" printing by typo-electric telegraphs, such, as for illustration
" merely, Bonellis, with no more than three wires or points, in-
" stead of five wires or points;" "that is, I place and arrange
" the printing types, under which term I include types of all
" kinds, in a horizontal position, as thus, ◁ ϖ ◡, and so forth,
" or vice versa, ▷ ϖ ◠, in lieu of the ordinary upright position,
" as thus, A B C, as heretofore employed, so that no more than
" three electric wires or points need of necessity be used to print
" with. Letters, or type, or figures of the ordinary forms in relief
" or intaglio may be used, except in the case of letters or figures
" the perfect outlines of which cannot be obtained from the ordi-
" nary forms of type by the use of three wires or points only, in
" which case I use types of modified forms." "By the use of
" type thus placed I cause the letters to be printed with fewer
" interruptions of the electric current than are unavoidably pro-
" duced in printing from type placed upright, as hitherto used,
" while the length of contact between the transmitting points of
" the wires and the metallic type allows sufficient time for the
" electric current to flow and transmit the marking to the re-
" ceiving station."

[Printed, 4*d*. No Drawings.]

A.D. 1864, April 9.—N° 899.

THOMPSON, Jacob Baynes.—"Improvements in electro-"magnetic induction machines."

"This invention has for its object the so arranging electro-"magnetic induction machines as to make them suitable for use "for ordinary telegraphic purposes."

Two sets of induction coils are arranged "end to end and at a "short distance apart." "Between the two sets of coils I arrange "an oscillating armature, which by a rod connected with it, or "otherwise, is made as it moves to and fro to send the primary "current first into the primary wires of one set of induction coils "and then into the primary wires of the other set of coils. The "oscillating armature also moves the commutator by which the "currents induced in the secondary wire of the induction coils "which are reversed by the changing the primary current from "one set of coils to the other are nevertheless caused to pass "from the machine always in the same direction, the contacts "being changed by the commutator to compensate for the "changes in the direction of the induced currents." "This self-"action of the machine is an important feature of my invention."

Two condensers are used in the primary circuit "to lessen the "spark" which passes between certain contact pieces during the action of the apparatus.

[Printed, 10*d*. Drawing.]

A.D. 1864, April 14.—N° 940.

McELROY, John.—(*Provisional Protection only.*) "Improve-"ments in electric telegraph apparatus."

In a printing telegraph the motions of the type wheel are governed by the principle of permutation. Cam grooves, on a sliding shaft which is capable of being rotated by clockwork, correspond to the spaces through which the type wheel has to move to print its respective letters; by this means the motion of the type wheel is accomplished for each letter, a suitable degree and direction of motion being provided for. The type wheel remains stationary when the pin of the magnetic needle is against a stop at the end of each of the "intervals of grooves;" but, when the said pin is moved, the cam grooves act as an escapement wheel, and cause the shaft on which they are mounted "to slide "in the one direction or the other;" a clutch box, thus brought

into gear, causes the type wheel to rotate in one direction or the other, and the length of the cam grooves, coupled with the duration of the motion imparted through the clutch boxes, determines the extent of the type wheel's motion.

Means of suitably moving the paper, dependent upon the above-described principles, are set forth in detail.

The transmitting apparatus is constructed "after the manner "of pianoforte keys." Another method of transmitting consists in using suitably-shaped type set up "in a spiral form" "on a "cylinder," which is caused to revolve.

[Printed, 4d. No Drawings.]

A.D. 1864, April 22.—N° 1013.

CROSKEY, Joseph Rodney.—(*Provisional Protection only.*) "Improvements in machinery or apparatus for receiving and "paying-out submarine electric telegraph cables."

"This invention consists of improved machinery or apparatus "whereby electric telegraph cables may be taken or received on "board a vessel direct from the works without the necessity of "coiling such cables in the hold, as is at present done, and "whereby the cable may subsequently be paid out at any required "rate, and without the possibility of undue strain or kinking."

A large air-tight winding reel is mounted in bearings in a water-tight compartment of the vessel. "The cable end is to be "brought on board and attached to the reel, which is then to be "set in motion, whereby the cable will be gradually wound on to "the reel, being aided by suitable reciprocating lateral guides in "order to ensure a series or succession of even coils." When the entire cable has been received on to the reel, its water-tight compartment is filled with water, "so that the reel which is air- "tight will float."

In paying-out the cable any suitable motive-power may actuate the reel; disconnecting gear and a brake may be used when necessary. Constant electric communication is maintained with the departure station through the cable.

[Printed, 4d. No Drawings.]

A.D. 1864, April 28.—N° 1071.

CHAUB, George.—(*Provisional Protection only.*) "An im- "proved mode of transmitting currents of electricity for tele- "graphic purposes."

This invention consists "in producing new circuits for the " electric current by the use of the existing lines of insulated " wire." If three lines be in use and "run to earth as usual, " then all currents passed through them will return by the earth, " but if lines 1 and 2 are coupled at each terminus with an addi- " tional battery, and signalling instruments are placed in the " circuit, then a current transmitted through line 1 will operate " an additional instrument and return by line 2 without inter- " fering with the currents that may be passing through those " wires and returning by the earth.

" In like manner wire 2 may be coupled with wire 3, and a " current sent through the wire 2 by an additional battery will " operate an additional instrument and return through the wire 3 " to that battery. So also wire 1 may be connected with wire " 3 and form still another circuit by means of an additional " battery, another instrument may be made to transmit signals " without interfering with the operations of the original instru- " ments."

If four lines are used "the number of new circuits will be " considerably increased."

[Printed, 4d. No Drawings.]

A.D. 1864, May 4.—N° 1126.

HENLEY, WILLIAM THOMAS.—"Improvements in telegraph " wires and cables, and in apparatus used in their manufacture, " parts of which improvements are applicable to other useful " purposes."

1st. Insulating the conducting wires.—" Homogenous metal" is preferred to copper as the conducting material "when the line " is not of very great length." Alternate coatings of insulating composition and cotton fibre are given to the conducting wires, by machinery, at one and the same time.

2nd. Welding or joining steel or iron wires.—In one machine, one of the heated wires is gripped by grooved rollers, and the welding is accomplished by bringing down the tool upon the joint and causing the rollers to revolve, thus completing the operation, and elongating the wire at the same time. An air-gas blow pipe may be used to heat the wire. A machine for welding small wire consists of a pair of clamps to hold the wire and lever jaws that may be brought together by a sharp pressure of the

hand; an air-gas blow pipe is suitably placed to heat the scarfed ends of the wire.

3rd. Apparatus used in covering cables on the outside with bitumen.—After having had the hot compound poured upon it, the cable is grasped by a pair of hollow tongs, and then passed between grooved rollers; one of the said rollers is formed with deep sides to the groove, so as to pare off the superfluous material.

A wire gauge, with a pointer moving over a disc, is described and shown.

[Printed, 8*s*. Drawings.]

A.D. 1864, May 16.—N° 1234.

REID, William.—" Improvements in apparatus used for test-" ing the insulation of electric telegraph wires or conductors."

No. 1023 (A.D. 1853) described apparatus for testing " con-" siderable lengths of insulated wire at one time."

" Now the object of my present improvement is to arrange " apparatus suitable for testing joints and small lengths of insu-" lated or coated wire or other form of conductors. For these " purposes a strong box or vessel is constructed, having at the " opposite ends or sides suitable packings or stuffing boxes." The said box is made in two parts. " In testing the state of " insulation of a joint, that portion is placed across the one half " of the box or vessel and then the other half is closed and " secured tightly, so that only a short length of the coated wire " will be within the box or vessel when the testing is to be " conducted."

" The air is to be exhausted from the interior of the vessel, " then the vessel is to be filled with water, and by means of a " force pump the portion or short length of the cable is to be " put under the desired extent of pressure; a delicate galva-" nometer is to be placed in circuit with the two ends of the " cable, and any imperfection in the insulation will readily be " detected."

[Printed, 10*d*. Drawing.]

A.D. 1864, May 17.—N° 1242.

HAMILTON, John, junior.—" Improvements in electric tele-" graph posts."

" The upper part of the post is made of wrought iron, whilst

" the lower part or socket, by which the post is securely fixed in " the ground, is made of cast iron, and by preference of a cylin- " drical form." " My improvement consists in the arrangement " of a flange or plate which is combined with the socket to " prevent it sinking or shifting when set up in light or swampy " soil, the said flange or plate being made in two or a greater " number number of parts;" " also in forming holes in the flange " or plate to allow of the earth being rammed solidly around the " socket. Around the sockets at one or more places projecting " lugs are formed of such a shape as to fit corresponding dovetail " or other suitable parts of the flanges or plates, which are to be " fitted thereto and to project therefrom." " In these plates or " flanges holes are made of a size to admit of the earth being " rammed around the socket after the socket has been placed in " a suitable hole and the flange has been fixed thereon. One or " more of such projecting flanges or plates is or are fixed on a " socket according to the nature of the soil in which the sockets " are to be fixed."

[Printed, 8*d*. Drawing.]

A.D. 1864, May 25.—N° 1298.

PASSMORE, WILLIAM.—(*Provisional Protection only.*)

" Making sewing machines, rotary hair brushing machines, elec- " trical apparatus, and lathes self-acting."

Clockwork machinery is employed for the said purpose, with the addition of a fly wheel to carry a band, " an extra slide bracket " for support of the fly wheel, and a break for regulating or " staying the motion." For electrical apparatus this machine will be worked " by spring and barrel." " I propose to connect " my machine to the machine or apparatus to be rendered self- " acting by means of a band or line to be carried over the fly " wheel of my machine and the fly or band wheel of the machine " or apparatus to be acted upon. When my machine and the " machine or apparatus to be acted upon are thus connected, " motion will be imparted by winding up my machine with a " winch similar to the winding up of clocks. The break before " mentioned for regulating or staying the motion consists of a " metal skid pan (lined with leather or other substance) attached " by hinge to the foundation plate of my my machine beneath " the fly wheel in such a way that it can be raised (by pressure

"of the foot or otherwise) to catch the fly wheel and thus "regulate or stay the motion as may be required."

[Printed, 4d. No Drawings.]

A.D. 1864, May 25.—N° 1303.

SCHAUB, George.—(*Provisional Protection only.*) "An improved mode of transmitting currents of electricity for telegraphic purposes."

This invention relates "to the production of new circuits "for the electric current. These new or additional circuits I "obtain by connecting the transmitting wires with a line or lines "of insulated wire in addition to their being connected with the "earth, which line or lines will act as artificial earth lines for the "return currents. Every one of the transmitting wires may be "connected with each of these artificial earth lines, if there are "more than one, and the number of new circuits will increase in "ratio proportioned to the number of these artificial earth lines "or wires employed. For instance, supposing there are four "transmitting wires connected with the earth by which the "return currents are conveyed, only four operators can use these "lines simultaneously, but if these four transmitting wires are "put in connection with a wire which acts as an artificial earth "line, then the number of operators and transmitting instruments "can be doubled. If a second earth wire is employed three "transmitting instruments may be connected with each tele-"graphic wire, and thus 12 operators may transmit signals simul-"taneously through the four transmitting wires, and so on, the "ratio increasing according to the number of additional wires "used."

[Printed, 4d. No Drawings.]

A.D. 1864, May 30.—N° 1340. (* *)

SMITH, Willoughby.—(*Provisional Protection only.*) "Improvements in 'tell tales' or apparatus for registering or "indicating the hour at which any desired apartment or spot has "been visited."

The apparatus consists of an ordinary clock and other mechanism. Springs on the dial enable the hour hand to complete electric circuits at the desired times; a separate circuit and electro-magnet are allotted to each time. In its normal or inactive condition, the

spring armature of each electro-magnet holds a label (marked with the time that the hour hand indicates when the corresponding electro-magnet is excited); on the completion of the circuit by the hour hand, the armature is attracted and allows the label to drop into a groove in the box and to expose its number through an aperture in the said box.

It is preferred to place a simple time "contact" in various parts of the building, which will not allow the circuit to be completed until all the parts are visited at stated hours.

The "time contact" "consists of an ordinary sand-glass fully "suspended between the brass uprights. The glass in its normal "state takes a vertical position." The person in charge, with a suitable key, gives the axis of the glass, and therefore the glass itself, a half turn, and the electric circuit in that position is completed through a cam and spring. When the glasses are all turned, the circuit is complete, and remains so until nearly all the sand has run down and one of the glasses becomes vertical; it then lifts the cam from the spring.

[Printed, 4*d.* No Drawings.]

A.D. 1864, June 3.—N° 1386.

CLARK, William (*a communication from Jean Henry Cazal*).—"Improvements in electro-magnetic and magneto-electric apparatus, and their application as a stationary or locomotive driving "power."

1st. "The use and application of an electro-magnetic bobbin, "having a large surface, to all kinds of known electrical apparatus."—The copper wire of the bobbin is wound on an iron reel, on the two ends of which are applied two iron rings "in such "manner as to nearly enclose the reel and the wire wound "thereon."

2nd. "Stationary or locomotive apparatus constructed on the "principles herein described."—A shaft is applied to the axis of the reel, and the whole is pivoted so as to work a suitable wheel commutator on the said axis. Iron armatures are fixed concentrically with the bobbin, and an electro-magnet with multiple poles to utilize the said armatures is obtained by making spaces in the plain cylindrical surfaces of the rings of the bobbin. Railway axles can, by this means, be made available for obtaining power.

3rd. Magneto-electric apparatus.—Permanent magnets are substituted for the iron armatures in the above-described motor, and when rotary motion is imparted to the bobbin, a magneto-electric current is produced.

Many applications of this invention are suggested.

[Printed, 1*s*. 2*d*. Drawings.]

A.D. 1864, June 6.—N° 1405.

PREECE, William Henry.—" Improved domestic telegraphic " apparatus."

Instead of alphabetical signs, the inventor employs " a printed " key or code of signals forming an appendage to the signal " receiving instrument, and representing the ordinary require- " ments of the household as dinner, tea, bread, coals, &c. These " items when numbered may be referred to by audible beats of " the instrument corresponding to the appended numerals or in " the absence of numerals by a portion of the printed key or code " being temporarily brought into view."

In one apparatus " two bells are placed within reach of a ham- " mer which is hung between and operated by two electro- " magnets." The deeper toned bell, when struck, represents tens and the higher toned bell reqresents units. The hammer is caused to strike one or other of the bells according to the electro-magnet which is excited. A pair of operating keys (one to each electro-magnet) is used to transmit the signals to the above-described receiving instrument.

An indicating instrument consists of a slotted disc of pointer moved over a suitable dial-plate or code of signals by a step-by-step motion imparted to the said disc or pointer by the action of electro-magnets upon clicks; the clicks thus rotate the disc or pointer by operating upon a ratchet wheel mounted on the pointer axis and bring the disc or pointer to the required signal.

[Printed, 1*s*. 2*d*. Drawings.]

A.D. 1864, June 7.—N° 1412.

BONNEVILLE, Henry Adrien (*a communication from Victor Delaye*).—" Improvements in telegraphic printing apparatus."

This apparatus consists of a " manipulator," a " composing " system," and a " printing system."

The "manipulator" consist of a letter disc, over which a handle rotates until it arrives at the letter to be signalled, when it is depressed. The winch handle, by means of an articulated lever and contact pieces, brings into action a stronger electric current when depressed than when it is merely rotated.

The "composing system" is to enable a type wheel to follow all the movements of the winch or handle of the manipulator. It is worked by alternate weak electric currents and has a clockwork movement and electro-magnets that are totally independent of those of the "printing system," which is only brought into action by the stronger electric current allowed to traverse the receiving apparatus upon the depression of the handle of the manipulator. The type wheel may be placed at blank by pressing on a button and thus inclining the support of the type wheel so as to disengage an escapement wheel on the type-wheel axis.

When the "printing system" is brought into action, a "piston" raises the paper against the letter to be printed, and two rollers then draw through an equal length of paper, so as to be ready for the next impression.

To furnish the above-mentioned unequal electric currents, either two separate batteries may be used or one battery may be unequally divided.

[Printed, 1s. Drawing.]

A.D. 1864, June 13.—N° 1458.

McELROY, JOHN.—(*Provisional Protection only.*) "Improve-" "ments in electro-telegraphic apparatus, and in instruments for" "preparing the transmission of electric telegrams."

1st. A printing apparatus in which both positive and negative currents are employed; "either three or two line wires may be" "used, type or a perforated ribbon of paper being employed in" "the transmission of signals."

When three line wires are employed, five levers make the requisite contacts at the transmitting station. At the receiving station two of the wires work two relays, in one or other direction according to the direction of the line-wire current, the third-line wire is directly connected to the printing apparatus; thus there are "five" "printing wires." The terminal points of two of the printing wires are placed in advance of the other three terminal points; "in this manner the printing of each character is divided into

" three parts; by the first three currents the upper, central, and
" lower parts are printed, and by the following two currents the
" intervening parts are printed."

When two line wires are used, the printing of each letter is divided into three parts; the first part is formed by two positive currents, the second by two negative currents, and the third by a positive current along one wire and a negative along the other; two relay needles are employed to effect "the printing of the final " part of the character."

2nd. A machine for perforating the paper.—The punches are placed on the peripheries of drums which are brought into position by a dial hand.

[Printed, 4*d*. No Drawings.]

A.D. 1864, June 22.—N° 1565.

ADAMS, John David (*a communication from Louis François Clément Bréguet*).—" Improvements in electrical communicators."

This invention relates to "domestic" "electrical communica-" tors."

The depression of a button, projecting from a small case, establishes a circuit by bringing the free ends of two metallic springs into contact. An electro-magnet is thus actuated, and causes a pivoted needle, in front of the case, to deflect. In the same circuit, and at any required distance, an electric bell is placed; this is caused to ring, upon the depression of the button, by the completion of the electric circuit in which the said bell is placed. Immediately, however, upon the deflection of the said needle, a second circuit is formed—passing through the axis of the needle, and by means of a stop placed on the said axis—and is maintained after the first circuit has been broken by the release of the button. The bell, by means of the above-described arrangement, continues ringing until the attendant at the bell breaks contact; when the bell has ceased to ring, the needle of the communicator returns to its normal position.

" According to another arrangement of electrical communi-
" cator intended for establishing an electric communication with
" several bells or indicators it is proposed to employ as many in-
" sulated conducting wires as there are bells or indicators to be
" operated upon." The box in which these wires terminate is

provided with as many depressible buttons as there are wires. The depression of a button acts upon a blade spring in connection with one of the wires and, at the same time, makes electrical connection with the battery, and sends the desired current to the desired place. The ring in connection with the battery is surrounded by the buttons, but is not in contact with any of them until a button is depressed.

[Printed, 8*d*. Drawing.]

A.D. 1864, June 23.—N° 1571.

TIRAT, Joseph.—(*Provisional Protection only.*) "A new vol-" "taic apparatus for the relief of hernia in all its forms and" "stages."

"The apparatus is composed of two voltaic piles composed of" "discs placed one above the other when a voltaic current is kept" "up by means of alkaline salts introduced by means of a tube" "into the piles. The zinc discs are moveable, and are so inserted" "into the copper discs that the voltaic current can be *increased*" "or diminished at pleasure by means of multiplicating wires." "The entire apparatus is enclosed in a morocco belt or pocket" "lined with flannel. The belt or pocket has in internal and ex-" "ternal surface; the internal is intended to be placed horizontally" "or otherwise upon the surface of the body by means of the rup-" "ture bandage. It gives room for the two copper wires which" "unite the positive and negative poles of the piles within the" "belt or pocket. The two other extremities of these wires are" "attached to two copper buttons placed in the interior of the" "cushion of the rupture bandage, and by this means it conveys" "the voltaic current developed by the piles.

"The same apparatus containing the piles and the same" "mechanism may be used as a waistband, corset, bracelet, knee" "cap, and may be applied to any part of the body, and a con-" "tinuous voltaic current can be communicated to the internal" "surface of the apparatus by means of two copper buttons or" "strips of copper, which serve as conductors, conveying the" "current to that part of the body upon which the apparatus is" "placed. The apparatus varies in size, and according to its" "intended application and the intensity of the voltaic current it" "may be desired to be obtained."

[Printed, 4*d*. No Drawings.]

A.D. 1864, July 11.—N° 1720.

BROOMAN, RICHARD ARCHIBALD (*a communication from Victor Delaye*).—(*Provisional Protection only.*) "Improvements "in batteries and in electric printing telegraphs."

"The improvements in batteries consist in arranging their "elements in such manner as from the same battery to obtain "currents of different intensity; this I effect by placing an addi- "tional copper or zinc pole or electrode in one of the cells, and by "carrying a separate wire from each electrode to a sending "instrument a current of a different intensity will be transmitted, "say, to a sending instrument, and through it to the line wire by "the ordinary wire, and also from the additional electrode by the "separate wire to the sending instrument, then by connecting "the two at the sending instrument a current of increased inten- "sity will be transmitted along the line wire.

"My improvements in electric printing telegraphs consist in "the employment of reinforced currents or currents of different "intensities, transmitted along one and the same wire, that is to "say, I employ an ordinary current and when required an in- "creased or reinforced current, whether produced in manner "before described or otherwise (whether voltaic or electro-mag- "netic) for the purpose of producing the release and consequent "revolution of the type wheel, and by the reinforced current the "release and consequent action of the printing machinery."

The Drawing shows a divided battery, the third electrode coming from a cell rather less than half way from the opposite pole; the battery has one zinc (or negative) pole and two copper (or positive) poles. The strong current magnetises a large armature at the receiving station, thus releasing a detent and enabling the printing hammer to be actuated by separate clockwork.

[Printed, 6*d*. Drawing.]

A.D. 1864, July 21.—N° 1823.

NEWTON, ALFRED VINCENT (*a communication from Royal House*).—"Improvements in electro-telegraphic apparatus."

This invention relates to a "phonetic telegraph" in which a suspended magnetic needle strikes against "sonorous limiters."

The "proportional helix," that deflects the needle, is made up of a number of distinct helices that are proportionate in number and size to "the waste current of the line to its most distant

"battery." The "deflecting magnetic needle" is suspended by "an adjustable torsion suspension thread," "which may have its "force adjusted to meet the requirements of the waste current of "a magnetic telegraph line, and also to serve as a reacting force." The "sonorous limiters" are bars of bell metal that extend into the centre of the helix, near to the needle, and parallel to the axis of the said helix; their external ends are fixed into a "*concen-*"*trating* sonorous head" of curvilinear form at the inner end of "a conical tube situate within a larger metal cone *affixed to the* "case containing the proportional helix;" the aperture *of the* sonorous cases is situated close to the ear of the operator. The torsion wire of the needle is suspended to the axis of an upper spur wheel, and is stretched vertically by means of an "axial "weight" which passes loosely through the journal of a lower spur wheel; by connecting gearing, and an index hand, the reacting torsion force employed in oscillating the needle may be determined. A "current adjuster," consisting of water tubes, in which "regulating circuit wires" are inserted, and in *which* the regulation is effected by moving the index hand of the torsion apparatus, gauges the amount of electricity passing through the helix.

Lightning conductors "carry off atmospheric electricity from "each side of each helix."

[Printed, 1s. 4d. Drawings.]

A.D. 1864, July 23.—N° 1840.

LE BOULENGÉ, Paulus Æmilius.—"An electro-balistic "chronographe."

"This invention consists in an electric chronographe for mea-"suring short spaces of time with great accuracy, and especially "for denoting the time a projectile takes to pass through a por-"tion of its trajection."

On a fixed vertical frame, two electro-magnets are fastened at different heights. To the upper one, during the passage of an electric current through its coils, a "time measurer" is suspended; to the lower one a "weight." The "time measurer" is a hollow metallic cylinder, having at the top a steel plug; two paper tubes are placed respectively on the upper and lower portions of the cylinder. When a "disconnector" breaks the separate currents of the two electro-magnets simultaneously, the weight, in its fall,

actuates a trigger and knife, and cuts a mark on the lower paper tube during the fall of the "time measurer;" there is thus obtained a certain height (H), which corresponds to a certain time (T). When the said separate currents are broken by the traversing of two frames (one to each current) by a projectile, so that the fall of the "time measurer" precedes that of the weight, the upper paper tube is marked by the knife; there is thus obtained a second height (H^1) of the fall, corresponding with a time (T^1). Then $T^1 - T$ is "exactly the measure of the time" which the projectile has taken to pass from one frame to the other, and, if this distance be called E, $\frac{E}{T^1 - T}$ = the speed of the projectile between the frames.

Inverse currents (one to each electro-magnet), which always exist, reverse the poles of the respective electro-magnets "at the "instant of the rupture of the direct circuit."

When the indication is obtained by the induction spark, a "time measurer" and a frame holding two points are only required; this apparatus "is applicable to the measure of velocity "in the barrel of a fire-arm."

[Printed, 10*d*. Drawings.]

A.D. 1864, August 8.—N° 1973.

DUJARDIN, PIERRE ANTOINE JOSEPH.—"Improvements in "electric telegraphs."

1st. "Employing in electric apparatus a resistance suitably "appropriate" "for giving passage to most part of the extra "current, which diminishes considerably the sparks at the break-"ing points of the circuit." In an arrangement adapted to a relay, the terminal wires of a locally-excited electro-magnet are connected with the adjustable poles of a voltameter, or with "neutral resistance coils."

2nd. Inking the type wheel of printing telegraphs by means of a velvet tissue, through the weft of which the ink is fed. The velvet is clipped to the bottom of a tube containing the ink; the raising or lowering of a piston (in the said tube) regulates the supply of the ink. No. 1772 (A.D. 1863) is mentioned in connection with this improvement.

3rd. "Employing in the clockwork movement, whereby the "type wheel is made to rotate, escapements so disposed as to

" work spontaneously through the simple action of the driving " spring or weight." A pin wheel on the type-wheel axis, in conjunction with inclined pallets oscillated by a local electro-magnet, is employed. Unless a current is passing, the pin wheel rotates; if an intermittent current passes, the type wheel rotates one character at a time.

4th. A " variable discharge invertor." Two springs, respectively connected to the earth and line, bear against an adjustable abutment (connected to a battery pole), unless deflected therefrom by the free end of a lever whose tail works in the groove of a sinuous wheel, the lever being connected to the remaining battery pole.

5th. A bell working at the sending station " at the command " of the receiving station." So long as the current that actuates the bell proceeds from the sending station no effect is produced thereon, the bell being directly connected with the battery, and the said current being therefore always in one direction; if a current in the opposite direction arrives from the distant station, the polarity of the electro-magnet is altered, and the bell is sounded.

[Printed, 1*s*. Drawings.]

A.D. 1864, August 15.—N° 2029.

MOORE, SIEGMUND.—" Improvements in electro-gilding."

By means of this invention " a more rapid, durable, and richly " colored deposit of gold is obtained than by the ordinary means."

The electro-gilding solution contains " prussiate of potash," " pearl potash," " iodide of potash," " carbonate of soda," " cyanide of copper," " cyanide of silver," " fine gold," and water.

" I apply a battery of which the conductor is a zinc plate with " a copper wire attached thereto, the other end being connected " to the article to be gilt in the bath, the zinc plate being sus- " pended in the solution; this form of battery will be found " sufficiently strong to cause the decomposition and deposition of " the gold upon the article, and the results first stated will " thereby be accomplished; but if thought more convenient, an " independent or separate battery may be employed."

[Printed, 4*d*. No Drawings.]

A.D. 1864, August 18.—N° 2047.

TREGASKIS, Thomas Philip.—(*Provisional Protection only.*) "Improved use of magnets in overbalancing weights."

From the Provisional Specification it appears that radial magnets are capable of sliding to or from the axle of the vertically-revolving wheel on which they are mounted; the said magnets may be stopped in any required position by means of catches. A stationary set of magnets (in the same plane as the wheel), the faces of which are arranged in a circle eccentric to the circumference of the said wheel, is fixed, so that its upper part may touch the outer faces of the sliding magnets "at some part of "the wheel which is uppermost;" "the lower part of the magnetic arc" is at some convenient distance from the faces of the sliding magnets in some lower part of the wheel. The outer poles of the sliding magnets glide over the smooth inner faces of the stationary magnets. The sliding magnets may be attracted towards the centre of the wheel by means of another set of stationary magnets that are placed between the axle and the inner poles of the sliding magnets, and that have a smooth convex face; the inner poles of the sliding magnets are attracted to the lower part of the stationary magnets.

Springs may supply the place of the inner stationary magnets.

By the arrangement in which magnets are used a "continuous "eccentric motion or force is formed," the sliding magnets being drawn away from the centre by the outer stationary magnets, and drawn towards the centre again by the central stationary magnets.

By the arrangement in which springs are used "a semi-eccentric motion" is produced. "A continual overbalancing of "sliding magnets or soft pieces of iron is thus produced."

The power of the apparatus will be in proportion to its size and to the weight of the sliding magnets.

[Printed, 4*d*. No Drawings.]

A.D. 1864, August 19.—N° 2063.

THOMSEN, Julius.—"Improvements in batteries for generating electricity, and in apparatus for converting the quantity "thereof into intensity."

A box, made of insulating materials, is divided into cells by platinum plates; an aqueous solution of sulphuric acid is placed in the cells. This box is called the "battery."

The surface of each plate is charged on one side with oxygen, and on the other side with hydrogen; this is accomplished "by "sending successively an electrical current through each separate "cell." The two poles of a common galvanic apparatus are attached to the axle of a "dispensatory," by means of which "the poles of the galvanic apparatus are successively brought "into metallic communication with all the plates in the battery." The "dispensatory" is a flat non-conducting ring, on which the same number of radial metallic plates or wires is applied as the battery contains of platinum plates, "so that each wire or plate "is connected with a corresponding plate in the battery;" a rotating axle is placed through the middle of the ring. When the said axle has made an entire rotation, all the battery plates are charged, and the battery "produces a constant electrical "current as long as the rotation of the dispensator is kept up."

One galvanic element is capable of charging all the cells of the battery continuously. "The electro-motive power of this battery "depends on the number of cells which the same contains."

[Printed, 4d. No Drawings.]

A.D. 1864, August 23.—N° 2080.

BROOMAN, Richard Archibald (*a communication from Arthur Nicolas George Bigant, Elie Gabriel de Fornier de Carles de Pradines, and Adolphe Sureau*).—(*Provisional Protection only.*) "Improvements in machinery for winding, unwinding, and "paying-out telegraph cables, applicable also to winding and "unwinding cords, ropes, and wires."

By this invention "the formation of knots and kinks and the "rupture of the cable," are prevented.

The machinery consists, first, of a combination of drums, on each of which the cable is wound in equal lengths; second, of accessory appliances. The drums are fitted near the hold on two longitudinal shafts; one on the starboard, the other on the port side of the vessel. Each drum is composed of a combination of truncated cones, washers, and a cylinder or drum proper. A "spiral" [helical?] groove, "round these different parts," receives the cable. The two rows of drums are connected by a "curved fixed bar" on which rollers are loosely fitted. To the front of the last cone of each row a large drum is fitted, and each large drum carries a coiled spring; a groove on the exterior of the drums carries the cable. A waggon, fitted with suitable

rollers, runs on a tramway above the first-mentioned rollers, and guides the cable, by means of suitable pulleys, from the stern of the vessel to each set of drums in succession, during the winding on of the cable, the shafts and coiled springs being rotated. The unwinding of the cable takes place inversely to the winding on. To prevent rupture of the cable during immersion it passes over a pulley, the supports of which " rest on a strong spiral spring ; " the speed of the vessel is made to correspond to the rapidity of paying out, a dial, the pointer of which is connected to the supports of the pulley, showing the tension of the cable.

[Printed, 4*d*. No Drawings.]

A.D. 1864, September 2.—N° 2158.

DE MOLIN, ANTOINE MARIE JOSEPH, Count.—" An improved " electro-magnetic engine."

Each electro-magnet is at a very small distance from its armature at the moment it is to attract the same.

A suitable number of horseshoe electro-magnets " are fixed " vertically in a concentric manner, at equal distances apart, on " a horizontal bed plate or ring," their poles being in a horizontal plane, and the line joining each pair of poles being radial. A vertical arbor revolves freely in the centre of the arrangement, above the plane of the electro-magnets, and its lower end carries a crank with a socket, to guide the motions of another shaft which is pivoted upon a pillar in the centre of the bed plate, and in the same horizontal plane as the poles of the electro-magnets. The latter shaft carries a plate, the under surface of which is slightly conical and carries a number of armatures corresponding to that of the electro-magnets used, each electro-magnet having its particular armature. Upon each of the electro-magnets in turn being caused to attract its armature, a revolving rolling motion is imparted to the armature plate, thence a suitable motion is given to the crank and vertical shaft, which may be transmitted to other machinery by well-known means.

To cause each electro-magnet in turn to attract its armature, one battery pole is connected with one terminal of the coil of each electro-magnet, and the other is connected with a radial spring that revolves over a fixed circle of insulated metallic plates in connection respectively with the other terminal of each electro-magnet. The radial spring is mounted on the above-mentioned vertical shaft, and the fixed circle is concentric therewith.

[Printed, 8*d*. Drawing.]

A.D. 1864, September 10.—N° 2217.

COOK, Harry Whiteside (*a communication from Gaetano Bonelli*). — (*Provisional Protection only.*) "Improvements in "electric telegraphs."

This invention relates to that description of apparatus in which moveable metallic types are used at the sending station, the said types being "passed under the two teeth connected with "different poles of two batteries;" the two remaining poles are "connected with the earth if the type be connected with the "line, or with the line if the type be connected with the *earth*;" "when the type comes in contact with either of the aforesaid "teeth" the circuit is complete, and an electric current is transmitted to the receiving instrument.

In this invention only one wire is used, a second line of dots is substituted for the dashes of the Morse system, greater rapidity and correctness is ensured, and economy of space effected.

On the upper end the types have the ordinary characters.

The prepared paper in the receiving instrument is passed under two teeth, the one connected with the earth, the other with the line; when a positive current is sent down one of the teeth, a mark appears on the paper at that tooth, but when a negative current passes down a tooth, no mark appears. The dots are therefore produced by one or other of the points, in one or other of the rows, according to the kind of current sent from the transmitting station.

[Printed, 4*d*. No Drawings.]

A.D. 1864, September 15.—N° 2254.

BERTSCH, Auguste.—"Improvements in lightning conduc-"tors for preventing atmospheric electricity damaging electric "telegraph instruments."

Two parallel copper plates are retained at a distance apart by means of insulating material. A great number of sharp metallic points project from the sides of the plates that face, and terminate within a very small distance of each other. One plate is attached to the cast-iron case of the instrument and thence to the earth, the opposite plate is connected with the line wire; a copper wire connected with the latter plate passes out of the case through an insulating tube of porcelain, "fixed in a water-tight manner to "the top of the case, and the exterior of the top of the porcelain "tube is made of a bell shape."

The case of the apparatus is cast in one piece, one of its sides being left open for the introduction and fixing of the plates with points that are described above; the open side is closed by a thick plate of glass which is fixed in its place in a water-tight manner. "The back of the box or case has two lugs or ears cast " upon it, through which screws are passed to fix the apparatus " in any desired position."

It is preferred to use the above-described instrument in connection with an apparatus set forth in a Provisional Specification, No. 713 (A.D. 1865).* In this apparatus a fine platinum wire is the conductor between the line wire and the telegraph instrument, and has points that are connected to the earth placed within a small distance of it laterally; when one wire is fused by an atmospheric discharge another wire is brought automatically into circuit, and, when all the wires are fused, a good and final metallic contact is made.

[Printed, 8d. Drawing.]

A.D. 1864, September 16.—N° 2260.

SIMPSON, JOHN HAWKINS.—"Improvements in printing by " electricity for telegraphic and other purposes."

1st. "New combinations of mechanism for the purpose of " transmitting through a telegraphic circuit messages previously " prepared (by being either set up in type or written in insulating " ink on some metallic or other conducting surface), and causing " the same to be printed at a distant station, and for the purpose " of printing by electricity from type or writing without the use " of a telegraphic circuit."

2nd. "Manifold printing by electricity, whether a telegraphic " circuit is used or not."

The first part of the invention consists of a "printer." In this instrument, the required number of styles are placed in a frame, in metallic connection with each other; they are fixed so as only to permit one style to be in contact with the object to be traversed at the same time. Two "printers" are employed, one used in connection with type at the sending station, and the other employed in connection with prepared paper at the receiving station. The form of "printer" which is preferred has its styles arranged

* This Provisional Specification is dated the 14th of March 1865, being one day previous to the filing of the above Specification.

"helically" round the periphery of a wheel, and the desk that carries the prepared paper, curved to the periphery of the wheel and stationary. In another arrangement, the styles are stationary (being placed on the surface of a cylinder), and the type or prepared paper is in motion. In a third "printer" the styles traverse the type or paper in a straight line.

Connecting bars, in conjunction with an armature lever, form the detent.

When copies are required, the breadth of that part of the "printer" that carries the styles is increased, and as many series of styles employed as there are copies required. "Relays or local "batteries might be necessary."

[Printed, 8*d*. Drawing.]

A.D. 1864, September 23.—N° 2341.

NEWTON, ALFRED VINCENT (*a communication from Daniel Hovey Southworth, Blase Lorillard, and Charles Ferris*).—"Improvements in the mode of and machinery for manufacturing "telegraphic cables."

"The principal feature of this invention consists in a novel "construction of and mode of applying an insulating piece of "gutta percha," "whereby the said piece is made to serve both "as a central core for the separation" of the wires, "and an "envelope for enclosing the same." This insulating piece, as applied to four wires, is cruciform in cross section, and the number of radiating portions or "fins" is always equal to the number of wires that collectively form one cable.

A train of machinery is employed to cover wires and to manufacture telegraphic cables, according to this invention. The conducting wires are supplied from spools that are mounted in a suitable frame. Next to this frame, two pairs of rollers—through which the insulating piece is first passed—are arranged. Two of the fins of the insulating piece pass between the upper and lower rollers; the other two fins pass respectively through the space left between the two upper or the two lower rollers. The insulating piece, passing from these rollers, meets the wires in a stationary die; it then passes (together with the conductors) through a hollow mandril, the rotary motion of which turns the fins of the insulating piece over the conductors and envelopes them. The enveloped conductors then pass through the hollow spindle of a rotary flier, by which it is wound with wire or cord;

then through another rotary flier, by which it is wound with another cord and with a tape; it subsequently passes through a vessel containing melted or dissolved India-rubber, through a cooling vessel, and through a hollow rotating pulley, by which it is coated externally with wire or yarn.

[Printed, 8d. Drawing.]

A.D. 1864, September 4.—N° 2350. (* *)

ARTHUR, WILLIAM.—(*Provisional Protection only.*) "Im-
" provements in compasses or apparatus for registering the course
" steered by a ship during any given period."

The pivoted vertical axis of the paper cylinder carries one or more permanent or electro magnets. A pencil is made to dip by clockwork, at regular intervals, so as to mark the divided paper. Either by a threaded rod or by a band passing over rollers, "the
" pencil is made to descend gradually from top to bottom of the
" cylinder."

The position of the compass needle may sometimes be communicated, at intervals, "by electricity," to a paper band placed in the cabin, by the following means:—A ring with an inner flange, fitted to the compass, is made to rise and fall at intervals by clockwork; in its downward movement, one end of the flange presses down one end of a balanced bar that is free to turn with a
" magnet placed above it," "until it (the end of the bar) comes
" in contact with one of a series of wires" "arranged round a
" ring placed below." Each of the wires "is in connection with
" a separate wire leading to an electro-magnet; as soon as contact
" is made," the electro-magnet attracts its lever armature, which is furnished with a "pencil to mark upon the paper in the cabin;
" the paper may be caused to move by clockwork or by another
" electro-magnet."

"Instead of marking on the paper with a point or pencil, I
" sometimes employ paper prepared for photographic purposes,
" and allow the course of the vessel to be registered thereon by
" the action of light admitted through an aperture."

[Printed, 4d. No Drawings.]

A.D. 1864, September 27.—N° 2362.

CLARK, WILLIAM (*a communication from Anatole Jean Baptiste Lesieur and Pierre Désiré Prud'-homme*).—" Improvement
" in the means of actuating electric dials or clocks."

Instead of the wheel mechanism being acted upon directly by the armature of an electro-magnet, as in ordinary electro-magnetic clocks, the motion of the pendulum is regulated by an electro-magnet, and communicates motion to the wheel mechanism of the clock.

A soft iron armature is fixed at the lower end of a pendulum that oscillates in half a second, and is attracted whenever it arrives at the extremity of its arc of oscillation in one direction—every second of time—by an electro-magnet at the extremity of that arc, and which becomes active every second; the regularity of the oscillations of the pendulum is thus provided for. It is to be remarked that the electro-magnet is vertical, and that its upper horizontal surface or pole is placed at such a distance from the horizontal surface of the armature as to permit of the pendulum oscillating freely without striking the said horizontal surface or pole of the electro-magnet.

The projecting tooth of a lever that is fixed to the pendulum, near its upper end, rotates a ratchet wheel one tooth "for every "double oscillation of the pendulum." The outer end of the lever rests on a fixed steel point, and has a notch to allow of the said lever "being depressed in a given time in order to advance "the ratchet" "one tooth only, said ratchet communicating "motion to the wheel mechanism."

By the above arrangement, synchronism may be obtained in the movements of all the clocks in a town.

This method "is also applicable to a balance wheel arrange-"ment furnished with a spiral spring."

[Printed, 8*d*. Drawings.]

A.D. 1864, October 1.—Nº 2423.

GISBORNE, Frederic Newton. — "Improvements in the "means of working electric signals for gunnery practice."

This invention is for the adaptation to gunnery practice of two former inventions, viz., Nos. 210 and 3208 (A.D. 1863).

In connection with No. 210 (A.D. 1863), the magnetised armature of the shutter is raised by magnetising the electro-magnet with contrary poles to those of the armature; the armature retains that position until a feeble reverse current repels the shutter to its normal position.

In connection with No. 3208 (A.D. 1863), "a series of shutters "or polygon wheel, cylinder, or disc" is caused "to revolve by

" a step by step movement occasioned by the action of an electro-" magnet or magnets acting on a toothed wheel."

The Drawings show the following apparatus :—A "captain's " communicator," with an electro-magnetic bell; an "indicator," with an electro-magnetic bell; a "dial face," upon which are two shutters as in No. 210 (A.D. 1863); and "contact boxes to " shew the lay of a gun," or " the movements of an engine shaft," by means of a contact piece on the shaft, and two levers with their respective springs. In the communicator, a fixed "contact " circle" has alternate large and small metallic segments, and is acted upon by a "revolving wheel" at the extremity of a revolving arm, which wheel makes side contacts with the segments; this apparatus produces intermittent currents, the small segments only being connected to the galvanic battery. On the transmission of an electric current, a roller at the extremity of the armature of the indicator raises an escapement lever, and causes an octagon to revolve half a tooth; when the current ceases (the pointer of the communicator being at an order) a helical spring depresses the escapement lever, and revolves the octagon another half tooth.

[Printed, 8*d*. Drawing.]

A.D. 1864, October 6.—N° 2459. (* *)

HUNTZINGER, Emanuel Vincent Frederick, junior.—(*Provisional Protection only.*) " Improvements in compasses."

The object of this invention is the construction of mariners compasses so that they shall not be influenced by iron in their vicinity, whether the said compasses be used on board ship or on land, or in mines.

The inventor states that he has " discovered that iron has little " or no influence on the south of the compass needle which is " pointed towards the north, and that on the north the iron acts " with great power." Keeping this principle in view, the needle of the inventor's compass is suspended upon an ordinary pivot, and " that part of the needle which corresponds to the north " is cut away and replaced " by a portion of a needle made of " copper or other substance of, by preference, the same shape as " that cut away, in order to counterbalance the part which " remains, as well as the mariner's card, which is there united in " the ordinary manner. The needle thus formed acts as in com-" passes of usual construction but without being influenced by " the iron in its vicinity."

"My invention further consists in regulating compasses by "applying thereto small pieces of soft iron which I fit to the "compass basin, and in some cases I use an iron ring without "solder."

The latter method, "although good," is "not equal to" the first plan, as the latter requires "time for rectification on board," while the "lever compass needle" "can be placed on board an "iron ship without the necessity of adjustment."

[Printed, 4d. No Drawings.]

A.D. 1864, October 6.—N° 2463.

SHEILDS, Francis Webb.—"Improvements in telegraphic "posts."

This invention "consists in constructing each post in two "parts, one to be driven into the earth and the other or upper "part to be fixed to the lower part. The section of iron or steel "used may be varied, but it is preferred to employ two pieces of "angle iron in constructing each post, the lower piece being of a "larger and consequently of a stronger section than that used for "the upper part of a post. The lower piece is pointed or "sharpened at its lower end to facilitate its passage into the earth "when being driven. The insulators and instruments for sup-"porting the wires are applied at the upper part of each post."

The Drawings show posts of various cross sections, such as angle iron, T iron, and H iron; the upper and lower pieces may be either bolted or rivetted together, but it is preferred to bolt them together. The insulators are shown supported by a horizontal cross piece of angle iron bolted on to the post at a suitable height, or they may be connected to the post itself. If desired, a continuation of the upper part of the post, made of lighter angle iron, may be used to support the insulators. In one instance, the lower end of the post is a hollow cylinder, the bottom end of which is sharpened, and the upper part is cruciform in transverse section; "the upper part of the post having been inserted into the lower "part, wedges of wood or iron are driven in." Other kinds of posts may be joined by wedging. Welding may be employed to join the upper and lower parts of posts. The upper portion may be bent just above where it is fixed on to the lower portion, so as to admit of the convenient driving of the lower part into the ground by the blows of a hammer.

[Printed, 8d. Drawing.]

A.D. 1864, October 10.—N° 2486.

COLLETTE, Charles Hastings (*a communication from Theodore Faucheux*).—(*Letters Patent void for want of Final Specification.*) "Improvements in magneto-electric machines."

"The object of my invention is to render the magneto-electric "light, as produced by known machines, more steady, more "continuous, more intense, and in its production more economi- "cal." The apparatus is described as applied to Nollet's magneto-electric machine, but it can be applied to any other.

The magneto-electric machine is enclosed in a wooden box which is placed "on an iron frame with bearings to support the "spindle of the cylinder of the machine, without interfering with "the apparatus for transmitting the rotary motion to the cylin- "der." The box is lined with a non-conductor of heat. The air (heated as hereinafter explained) enters the box at an aperture at the bottom thereof, and departs therefrom at an upper aperture. The heated air operates "simultaneously on the whole of the "internal cylinder and of the armatures fixed to the cylinder;" "between the cylinder and the lower aperture" a heating appara- is placed, "for the purpose of heating the air which passes "through the box." The heating apparatus which is preferred is a steam-heated metal tube. "By raising the temperature of "the internal air I obtain the objects above stated. The tempe- "rature I recommend is about 70 degrees Fahrenheit. The "internal temperature may be ascertained by any convenient "method. I prefer to fix a thermometer in the box, so as to be "seen from the exterior through an aperture covered with glass."

[Printed, 4*d*. No Drawings.]

A.D. 1864, October 14.—N° 2533.

SYKES, William Robert.—"Improvements in apparatus for "transmitting positive and negative currents of electricity."

"To a frame I fix what I term a top metal plate and put it "always in communication by means of a wire with the negative "pole of a battery. I fix on another part of the frame a metal "block, hereafter called the bottom block, with two points of "contact, and put it constantly in communication with the "positive pole of a battery. From the top plate, carried by "projecting brackets, depend two metal studs. At the back

"part of the frame I fix two metal standards, one in communication with the earth and the other with a line wire. To each of these two standards I attach the back ends of a double leaf or tweezer spring. The open and inner ends of these springs project over the points of contact of the bottom metal block, but do not touch them. When the instrument is at rest the upper leaves of the tweezer springs rest against the under surface of a metal cross head affixed on the inner end of a shaft which passes through the front frame of the apparatus, and which carries the handle whereby the instrument is worked. On putting the handle on one side it brings one end of the cross head down upon one end of one of the tweezer springs and forces both leaves in contact with the bottom block, at the same time the other end of the cross head being raised allows of the upper leaf of the other tweezer spring making contact with the metal stud above it and depending from the top metal plate, thus by turning the handle to one side or the other positive or negative currents are transmitted."

The Drawings show the above arrangement adapted to a single-needle telegraph instrument. The instrument shown has also an electro-magnetic bell.

[Printed, 10*d.* Drawing.]

A.D. 1864, October 14.—N° 2536.

CROSSLEY, LOUIS JOHN.—(*Provisional Protection only.*)

"Improvements in supporting and insulating overground telegraph wires."

"The improvements consist in a peculiar form or forms of construction and mode of fixing insulators so as to render insulation more perfect."

The Drawings show vertical sections of insulators which "may be constructed of earthenware or other suitable non-conducting material."

In one instance, the supporting arms and insulators are combined; these are "intended to be made of earthenware and bolted to the posts. To give strength iron or other strengthening material may be embedded in the manufacture thereof." One of the said combined insulators has the passage to the groove in which the telegraph wire ultimately rests of a spiral form; the overhanging piece which gives the spiral character to the said

passage apparently has a piece of iron wire imbedded therein. The other combined insulator has a simple groove, apparently somewhat inclined to the direction of the telegraph line.

In another instance, the insulators are "fixed by bolts to the "supports." One of these has the before-mentioned spiral groove and overhanging piece that is strengthened with iron wire, as well as an inverted cup. The other has simply a top groove and inverted cup.

The third instance is a "shackle" insulator, of which two examples are given, one a terminal insulator, and the other to be used at an intermediate station. The terminal insulator is apparently larger than the other, and has a cylindrical groove round its body for the reception of the wire; inverted cups are placed above and below the said groove. The intermediate insulator is like the terminal insulator, except that it has an aperture completely through its centre for fixing.

[Printed, 1s. Drawings.]

A.D. 1864, October 28.—N° 2675.

PARKES, Alexander. — "Improvements in manufacturing "compounds of gun cotton and other vegetable substances "similarly prepared, also in the preparation of castor and cotton "oils and gum ballata to be used with or separate from such "compounds."

"In manufacturing compounds of gun cotton I employ a "solvent which I prepare by distilling wood naptha with chloride "of calcium." "The solvent thus prepared I add to the gun "cotton usually in such a proportion as to produce with it a "pasty mass, which I use for waterproofing or coating fabrics, "making sheets, tubes, and other articles, and *for insulating* "*telegraph wires.*" To prevent the above compound from becoming too hard, it is kneaded with castor oil in a mixing machine; the proportions of the ingredients vary according to the degree of toughness desired. The mixture for covering telegraphic wires should be very tough and flexible, "and it can "be applied with dies in the same manner as gutta percha."

Alcohol may be used in the place of wood naptha, and chloride of zinc or chloride of manganese may be substituted for chloride of calcium.

To lessen the combustibility of the above compounds of gun cotton, either the method set forth in No. 2359 (A.D. 1855) may

be used, or the compounds may be mixed with chloride of zinc or tungstate of soda.

According to this invention, dissolved gun cotton may be combined with oil which has been treated with chloride of sulphur; this combination produces a very elastic composition.

Gum ballata treated with chloride of sulphur, and compounded with dissolved gun cotton, may be used for the above-mentioned purposes.

[Printed, 4*d.* No Drawings.]

A.D. 1864, October 29.—N° 2681.

BELLET, Louis Philippe Gabriel, and DE ROUVRE, Charles Marie Philippe.—"Certain improvements in the "application of electricity as a motive power."

This invention consists in "the construction of a locomotive to "run on railways for the transmission of letters, the carrying of "passengers and merchandise from one place to another."

In this invention, the locomotive derives "its motive power "from one or more attractive points produced on the circum- "ference of the fellies of wheels, the attraction taking place "between these points and the plane on which the wheels are "running." Each of the motive wheels "must be prepared "with a number of electro-magnets, fitted according to the radii "of the circle, and their neutral points be near the nave, at the "moment the polar surface passes through the thickness of the "fellies and is externally on the same level. These wheels are "provided with flanges, and are made to run on iron rails, which "serve for armature. A commutator set on the axle of the "motive wheels directs the current by which the electro-magnets "are made to operate, to pass successively on each of the latter, "and consequently they operate alternately" from a point at a given height above the rail until they are in contact with the rail. The commutator consists of caoutchouc discs with platinum plates fixed to the axles of the motive wheels; over the discs certain "hammers" are fixed, which convey the electric current to the machine from brass wheels that are constantly in contact with wires between the rails, the said wires conveying the electric current from a stationary battery at one extremity of the line.

[Printed, 10*d.* Drawing.]

A.D. 1864, October 31.—N° 2687.

SIMPSON, John Hawkins. — "Improvements in electric "printing for telegraphic and other purposes, and in the "apparatus to be used for such purposes."

1st. A number of *insulated* printing styles are arranged on a revolving wheel or on a sliding bar, see No. 2260 (A.D. 1864), so that one style only is in contact at the same time "with the "matter to be printed from or copied;" they are so fixed that each style traverses a separate and parallel portion of the characters to be printed from or copied.

2nd. A "process of electric printing," or taking copies from metallic substances which have been previously printed or written upon in insulating fluid, "or stamped out by perforations in "paper," where the characters are written vertically, as in No. 893 (A.D. 1864).

3rd. For the said purposes, marking tin foil, or chemically-prepared paper, or perforated paper, in parallel columns, so as accurately to fix the position relatively to the printing styles of the characters to be printed from.

4th. Manufacturing sheets of metal or cardboard, divided into parallel openings between which the characters can be accurately imprinted or written or stamped out.

5th. Mechanism by which exact correspondence of the instruments "at distant stations" is secured. The revolving wheels carrying the styles, when not in use, are retained by the action of detents upon pins. On the completion of the electric circuit by the operator, electro-magnets (respectively at the sending and receiving stations) release the wheels, and permit the current to pass through the desks and styles until another pin comes in the way of the now active detent. This portion of the invention is not specifically mentioned in the Provisional Specification.

[Printed, 10*d*. Drawing.]

A.D. 1864, November 24.—N° 2941.

GAIFFE, Pierre Elie, and ZGLINICKI, Eugene.—"Im-"proved apparatus for engraving."

"The apparatus consists of two tables, one large and the other "small; the larger carries the original type or design to be "reproduced. The design is drawn in insulating substances "upon a metallic ground. The small table carries the plate

" which is to receive the engraving. Each table is provided " with a moveable carriage, and these carriages are driven by " machinery, which allows of their respective speed being " increased or diminished as required." The carriage upon the large table carries a style or "reader," "and the other a graver " moved by an electro-magnet." The style and the electro-magnet are in the same electric circuit.

" The carriages having a to-and-fro motion along the length of " the apparatus each time that the reader travels over a metal " part of the original design the current will pass into the electric " magnet," "and the graver will be raised. When, on the other " hand, the reader travels over an insulating part the current will " not pass into the electro-magnet, the graver" "will be left to " itself, and will trace the engraving to the depth required. By " forming two separate circuits from the electric wire, the one " passing by the reader and the other by a metallic point en- " graving in high relief, as wood engraving, may be produced." A lateral movement is also imparted to the reader and graver respectively in their carriages, " and thus every part of the design ' is traversed."

[Printed, 1s. 2d. Drawings.]

A.D. 1864, December 1.—N° 2997.

SAX, Julius.—" The impro[illegible]ment of electric fire buttons and " indicators capable of being use[illegible] houses, public " places, on board ships, and on railways."

The improvement in electric fire buttons " consist[illegible] of the sim- " plicity of the action and the double purpose for w[illegible]ich it is " used." Besides the two ordinary electric contact springs[illegible] which cause the bell to ring (by pressure on the button), the wo[illegible]oden disc carries a metal cover, to the inside of which a compo[illegible] spring of brass and steel is fixed. Undue heat causes the free [illegible] of the compound spring to unbend itself slightly, and to compl[illegible] the electric circuit through a metal angle piece.

The indicating instruments, connected with these butto[illegible] through the telegraphic or signalling circuit, " shew the numbe[illegible] " of the room over-heated or on fire." The number of b[illegible] electro-magnets is equal to the number of buttons or circuit[illegible] involved. Each electro-magnet is horizontal, and has a sma[illegible] permanent horseshoe magnet for its armature; the said p[illegible]

manent magnet is mounted upon the lower end of a brass rod that bears, at its upper extremity, a signal disc or card, and that is centred so as to allow the said permanent magnet to vibrate in a vertical plane at right angles to the centre line of its electro-magnet. When an electro-magnet is excited, it attracts one pole or the other of its armature, according to the direction of the electric current which passes through its coils, and the said armature remains in the position it was last placed in, owing to the heaviness of the upper part of its brass rod. A current in one direction, through the signalling circuit, brings the signal disc to view. The pressure on a button (at the indicating instrument) restores the disc to its normal position, by means of a local current.

In a railway indicator, one electro-magnet, two studs, and two " bridges " are used, as " it is necessary to have two to cor-" respond."

[Printed, 10d. Drawing.]

A.D. 1864, December 14.—N° 3092.

HANCOCK, Charles, and SILVER, Stephen William.—" Improvements in electric insulation."

This invention consists " in applying the milk of ballata or the " milk of caoutchouc, or a mixture of the two to telegraph wires " or other surfaces requiring electric insulation."

The wire is passed through a vessel containing the milk, and one coat is allowed to become nearly or quite dry before a second is added, " and so on until the required thickness of coat is " obtained." In certain cases, " the milk may be applied by " means of a brush." In each coating, before adding another coat, the previous coat is treated with an aqueous solution of glycerine, or with pumice powder and water. " The wire may " also be insulated with ballata and caoutchouc in the sheet state " —as described in No. 3110 (A.D. 1864)—" by means of a taping " machine." On each succeeding tape, a coating of the milk of ballata, or of its mixture with the milk of caoutchouc, is applied to the taping. The wire may be covered with cotton, or other suitable material, " and afterwards coated or saturated with the " milk of ballata and caoutchouc." To perfect the insulation, the covered wire may be passed through the chloride of sulphur process.

" The compounded milk of ballata and caoutchouc when in the " state of sheets or blocks may be masticated in a masticating

"machine, and applied to coat and insulate telegraph wires by "means of the ordinary covering machine. The milk of caoutchouc, or the milk of caoutchouc and ballata combined may be "applied to telegraph wires which have had a previous covering "of india-rubber or india-rubber tape, or of india-rubber compound."

The application of the said compounded milk, when in the state of sheets or blocks, is not mentioned in the Provisional Specification.

[Printed, 4d. No Drawings.]

A.D. 1864, December 14.—N° 3095.

THOMPSON, Jacob Baynes.—"Improvements in coating "iron and steel with silver, gold, platinum, or palladium, and in "ornamenting articles with such metals."

The surface of articles of iron or steel is first alloyed by dipping them into a bath of melted metal. "The metal most suitable for "this purpose is an alloy of tin, copper, and nickel in such proportions that it is about the hardness of the metals to be "deposited." On to the surface so alloyed (cleansed with potash and acid) gold, platinum, or palladium is electro-deposited by the ordinary process.

The above-mentioned alloy of tin, copper, and nickel has "a "suitable melting point for wiping and tempering." In the case of a steel knife blade, it is dipped into the melted alloy, first the tang end, afterwards the blade; the blade is then plunged into melted tallow. The alloy on the surface is then wiped off, "and "the blade plunged into cold water, which will give the proper "temper, if the blade were of such a heat that the alloy wiped off "perfectly clean, yet retained its lustre."

"When gold and platinum are used only for ornamentation on "the silver as a ground, they may be put on with a pencil." A sable hair pencil has "a hole down the centre of the handle for "the battery wire to pass;" "a strand of fine platinum or gold "wires, according to the solution with which the pencil is used "should be spread out in the brush part of the pencil, but only "sufficiently extended to be in contact with the solution held in "the brush, and these wires should be connected above through "the handle by means of an insulated copper wire to the positive

" pole of a battery, while the article to be ornamented is con-
" nected to the negative pole."

[Printed, 4d. No Drawings.]

A.D. 1864, December 28.—N° 3227.

PREECE, William Henry, and BEDBOROUGH, Alfred.—" Improved apparatus for signalling in railway trains."

These improvements relate to a method of communicating signals, or raising an alarm, to the guards or engine-driver of a train by a passenger. Also, intimation is instantly afforded to the said guards or engine-driver of the uncoupling of any portion of a train.

When a signal is given, a trembling bell in the guard's van is operated by a galvanic current, each passenger carriage being mounted with semaphore signals, which fall by their own gravity, indicate the signalling carriage, and complete the requisite electric circuit.

The trembling bell has a " rocking stop bar," worked by an electro-magnet separate from that which vibrates the hammer armature; the oscillation of the train, by this arrangement, cannot have any action upon the hammer.

The battery is fixed in the van. Two insulated conducting wires traverse the whole train, being connected up from each carriage by spring hook-and-eye couplings that make earth connections if the train separates, and thus actuate the bells in circuit.

To give a signal, it is necessary to break the glass front of the " releaser," and thus allow a spring piston to act upon the semaphore arm by means of levers and cranks.

In the Final Specification, a " line wire " and earth return circuit alone are set forth.

[Printed, 1s. 2d. Drawings.]

A.D. 1864, December 30.—N° 3244. (* *)

PERCE, Albert.—" Improvements in geographical globes and " illustrative objects to be used therewith."

Objects are temporarily attached to a geographical globe, for the purposes of illustration, by means of magnetic force.

1st. " Making a geographical globe in whole or in part of a " material capable of being permanently charged with magnetism,

" or of being attracted by a permanent magnet," whereby certain objects may be attached to the said geographical globe.

2nd. Making the said objects "in whole or in part, or with " attachments capable of being influenced by permanent mag- " netism," so that the same may be magnetised or attracted by the globe.

3rd. The combination of a globe, as described above, with the said illustrative objects.

The body of the globe is preferably made "of sheet iron or " sheet steel struck up into the proper form and the parts sol- " dered or otherwise attached to each other; it may however be " made of any other material and covered or coated with the " magnetic oxide of iron, to cause it to attract the illustrative " objects; or it may be cast hollow of cast iron." This body is covered with "maps to represent the distinctions of the surface of " the earth." The objects, either in whole or in part, may be made of a metal capable of being attached by a permanent magnet or of becoming permanently magnetic.

If the objects are magnetised, they should be kept in a partitioned box, with an iron or steel bottom, when the said objects are not in use. Both ends of the permanent magnet should rest upon the iron plate.

[Printed, 1s. Drawings.]

1865.

A.D. 1865, January 4.—N° 22.

CLARK, WILLIAM (*a communication from Charles Frédéric Carlier*).—(*Provisional Protection only.*) "Improvements in " electro-magnets and their application to telegraphic and other " purposes."

According to this invention, the core of the electro-magnet, insulated from the coil, is wound with a metal wire without any insulating covering whatever, the said metal wire forming the coil of the said electro-magnet. The "rows" or layers of coils are, however, insulated from each other "by means of a paper " covering of sufficient length to envelop the extreme coils."

"The wire connecting one bobbin with another should be pre-
"vented from touching the iron of the electro-magnet."

The inventor states that an electro-magnet constructed according to the above method is more powerful than ordinary electro-magnets for sustaining weight, and that "its attractiveness a° "distances apart" is also more marked.

The advantages of these improvements are:—1st. The saving of the silk covering of the wires. 2nd. The small dimensions and quick action of an electro-magnet of a given power. 3rd. The suppression of the extra current by the absence of insulation in the coils.

This invention is applicable to "the frames of galvanometers, "magnetic bobbins, and in all other instances where electro-"magnetic power is to be created."

[Printed, 4d. No Drawings.]

A.D. 1865, January 6.—N° 52.

TYER, Edward.—"Improvements in apparatus used in train "signalling on railways."

1st. To avoid the "tripping" of a step-by-step dial telegraph, the instruments are arranged "in pairs," so that two or more currents sent along the same line wire in the same direction will only record "one" signal. "Copper" currents only are sent from one station, and "zinc" currents only from its companion station. One instrument can only be continuously worked by currents that come from each station alternately; in the meantime any number of "bell" signals may be sent from a station without altering the position of the disc signal. No. 3015 (A.D. 1861) is alluded to, but the method of signalling preferred is by a revolving disc of six radial divisions, and a semaphore signal for "line blocked."

2nd. The use of two permanently-magnetic rings, fixed end to end on the same axle (like the figure 8), in connection with electro-magnets, to give angular motion to the pointers, relay contacts, &c. of telegraphic instruments. The said rings have suitable notches to admit the "horns" of the electro-magnet, and their poles are only separated by a minute saw cut. Many examples of their use are given.

3rd. Signals that act automatically if the train is "clear" of a tunnel, but which can be worked by hand in the event of a break

down in the said tunnel. A closed circuit (forward and return wire) is connected at one end with the automatic apparatus, and, at the other end, includes an indicating instrument having two electro-magnets (one fine wire, the other thick wire); one battery pole and one extremity of the fine-wire coil have earth connections. The automatic circuit causes only the fine-wire electro-magnet to act; the other then acts mechanically. An intermediate earth connection, made in case of accident, cuts the fine-wire electro-magnet out of the circuit, and enables the thick-wire electro-magnet to act; the fine-wire electro-magnet then acts mechanically.

4th. Making and breaking electrical connection between the line wire and earth. An India-rubber air bag is firmly fixed to the end of a small iron tube, which is bent in the form of the letter U; a further length of tube is taken up towards the line wire. An insulated wire from the line wire is passed down the open end of the tube, the tip of the said insulated wire being exposed for a certain length. "The U-bend is then to be partially filled with "mercury, and the iron tube permanently connected with earth." To transmit a signal, the India-rubber bag is grasped suddenly; the air contained therein forces the mercury into contact with the tip of the insulated wire, and establishes the requisite connection between line and earth. When it is necessary to prolong the contact, a notched ball-valve is introduced into the free end of the tube, and allows the mercury to return gradually into the U bend. Arrangements for working this apparatus automatically, and other applications of this improvement, are set forth in detail.

[Printed, 2s. 8d. Drawings.]

A.D. 1865, January 7.—N° 55.

GALLOWAY, George Bell.—"Improvements in motive "power, and means of communication between passengers while "travelling, and appliances connected therewith."

These improvements consist in the application of principles involved and in part described in Nos. 651 (A.D. 1859) and 2765 (A.D. 1857); also in the aforesaid "means of communication."

In relation to motive power, a combination of air and water is ferred into steam boilers, and the resulting vapour either used directly in a steam engine, or superheated "prior to its being "applied as motive power; or I shall produce motive power

"through the use of any of the known agents *by which electricity*
"*is produced*, and *apply electricity in combination with water or*
"*air*, or both, by and through suitable arrangements, such as
"pipes, valves, and accumulators."

Other particulars respecting furnaces and motive power are detailed.

The means of communication between passengers while travelling consists of a central communication between the compartments of each carriage, and of certain mechanical arrangements which also admit of a communication being established with the guard. It is proposed to illuminate the said compartments.

[Printed, 6*d*. No Drawings.]

A.D. 1865, January 12.—Nº 98.

FULLER, John.—(*Provisional Protection only.*) "Improve-
"ments in the coverings of telegraphic conductors and cables."

"It has been found in practice that aerial telegraphic cables are
"much injured by gun shot and blows from various missiles.
"To obviate this I cover the cable with metal, either by winding
"wire spirally" [helically?] "round the cables, or lapping the
"cables round with a metal tape or band, or by other suitable
"means."

"It has also been found that where telegraphic conductors are
"covered with hard vulcanized rubber or ebonite it is very diffi-
"cult to join separate lengths. To obviate this difficulty, over
"the hard vulcanized covering I place a covering of ordinary
"rubber or gutta percha, which can be acted on by solvents or
"heat; the ends of the different lengths can thus be easily and
"perfectly joined."

[Printed, 4*d*. No Drawings.]

A.D. 1865, January 12.—Nº 101.

BARNES, Frederic, HANCOCK, David, and COWPE, Edward.—"Improvements in the method of and apparatus for
"applying electro-magnetism as a break power to railway and
"other carriages and machines."

This invention is applied to the wheels of a railway carriage in the following manner:—The electro-magnets are fitted on the under side of the carriage, and in a suitable frame, which is mounted on grooved wheels free to travel within certain limits

between rails or guides; the magnets are in communication by wires with a battery in the guard's van, or on the engine. "At "all times except when the break power is applied, the magnets "are somewhat withdrawn from the wheels of the carriage, and "are so maintained by a spring or springs united at one end to "the frame carrying the magnets, and at the other to a bar "fixed by preference at or near the central part of the under side "of the carriage, but on the current being applied the magnets "are thereby caused to advance against the wheels, and in so "doing the grooved wheels, and with them the frames and "magnets travel along the guides or rails, and as the magnets "approach the wheels the rotation thereof is stopped." The wheels are faced, by preference, with a ring of metal. The magnets may either be applied alternately to the wheels or they may be applied to all the wheels. The wires conveying the electric current may be so connected up that brake power may be applied simultaneously to all the wheels, "and the power at the same "time regulated according to the intensity of the current "employed."

This invention "can be applied with advantage in all cases "where a break power is required."

[Printed, 8*d*. Drawing.]

A.D. 1865, January 14.—N° 128.

LILLEY, John.—(*Provisional Protection only.*) "Improve- "ments in ship and other compasses."

"The object of the improvements is to obtain steadiness and "precision to the magnetic needle or indicator. For this purpose, "in addition to the magnetic needle or indicator as usually em- "ployed, I in addition use another magnetized bar or needle, "which is suspended in spirit or other liquid that will not freeze "at ordinary temperature. The chamber containing this liquid, "and the additional magnetized bar, is placed below the ordinary "or indicating needle or medium, and as the upper needle will "adjust itself with the south pole thereof to the north pole of the "lower one, I form the lower needle or bar of power sufficient to "control and govern the upper one, which is marked to indicate "accordingly. The lower needle or bar is formed with a centre "cone, by which it is suspended upon a central pivot, and there is a communication through its chamber by a rod or shaft, and

"arms or levers, and screw or other adjustment, by which the "bar suspended in the spirit may be raised off its pivot, and the "upper portion of its cone pressed against a corresponding "conical support provided for it, and there held when desired."

[Printed, 4d. No Drawings.]

A.D. 1865, January 19.—N° 156.

VAN CHOATE, SILVANUS FREDERICK.—"An improved "system and apparatus for facilitating the working of submarine "cables and other conductors of electricity."

The inventor states that the difficulties of operating long cables "seem not to have been attributed to the real causes. The true "principles of circuits, conductors, and electric currents have "been mainly overlooked, while the proper mechanical devices "for operating them successfully were not to be had. Un-"necessary importance has been attributed to the 'principles of "'the Leyden jar' induction, and what is termed 'earth currents,' "&c. &c." The inventor further remarks that when a long submarine circuit is attempted to be worked by a battery at the sending end only, the electric currents never reach the receiving instrument, but return through the insulation of the conductor, and that when two batteries (one at the sending, the other at the receiving end) are used, the receiving instrument is constantly disturbed by the current from the battery at its own station, but unaffected by the current from the sending station.

To obviate the above-mentioned difficulties, two improvements are set forth :—

1st. A method of working cables of a given length.—In each electric circuit, whether a forward circuit or a reply circuit, at each of the line is a battery, and revolving wheel. The wheels revolve synchronously, and produce breaks and closings of the circuit at the same instant, and in very rapid sequence; whether any particular break or closing is used to transmit a signal depends upon the manipulation of the keys of the sending instrument. It is said that by this arrangement there is no time for the abnormal currents to form.

2nd. Working cables at twice the distance that is possible by other systems.—With the above arrangement of synchronously revolving wheels and batteries, a delicate relay or relays is or are properly protected and sunk in mid-ocean. By this means the

battery at the sending station completes its circuit half way, and calls into action the battery at the receiving station for the other half of the cable.

[Printed, 10*d*. Drawing.]

A.D. 1865, January 24.—N° 206.

ROVÈRE, Jules, and HUGUET, Hilarion Antoine Bernard.—(*Provisional Protection only.*) " A new electric pile."

"We obtain electricity from the atmosphere by means of a " metal rod terminating in a sharp point and erected in an " upright position at the top of a house or building, or of a mast, " or pole. We obtain electricity from the earth by means of a " metal bar set in an upright position in the ground (preferring " damp soil), or in a well, or the like; this bar terminates at top " in a sharp point. If this point be placed near to the lower end " of the rod erected in the atmosphere an electric current will set " in from the atmosphere to the earth, or from the earth to the " atmosphere, whereby an electric pile is formed. When the " circuit of this pile is closed, that is to say, when in the space " between the rod or point fixed in the ground or well, and the " bottom of the rod erected in the atmosphere, there be placed a " body or an electro-magnet, the various effects obtained from " voltaic piles will be obtained from this arrangement, as, for " example, light, heat, and motive power. Several of such piles " combined will form a battery. To increase the quantity of " electricity we sometimes employ instead of the mast or pole for " carrying the rod erected in the atmosphere a captive balloon " or aerostat, that is to say, a balloon retained by cords or the like. " This balloon carries a number of metallic points communicating " with the lower pole of the pile by metallic cords, wires, or like " connections, which descend from the balloon nearly to earth."

[Printed, 4*d*. No Drawings.]

A.D. 1865, January 31.—N° 269.

BROOMAN, Richard Archibald (*a communication from Jean Arnaud Emile Laloubère*). — (*Provisional Protection only.*) " Improvements in rail and tramways, in laying electric telegraph " wires, and in compositions for insulating the same."

" This invention mainly consists in what may be called a " telegraphic rail composed of a tube of circular or other shaped

"section filled with an insulating bituminous composition "formed by preference as hereafter described. I leave a passage "or channel about one-third of an inch in diameter through "the centre of the bituminous composition to receive a telegraph "wire."

"The telegraph wire may be passed through the central pas-"sage of several tubes at a time." To make a joint, circular discs, at the head of each section of the wire, may be used; or a ring, fixed on one of the wires, may engage the other wire; or, lastly, the "spirally" [helically?] twisted end of one section of the wire may be inserted into the straight end of the following section. Small holes in the tubes (usually well stopped) are provided to ascertain a fault in the wire. When the rails are circular, they are laid in parallel trenches nearly filled with concrete, no sleepers or girders being used; the remainder of the trenches are filled up with one of the bituminous compositions hereafter described. In the case of a level road, a gutter is left, on each side of the rail, for the flanges of the wheels; or wheels "with "curved tyres" may be employed. One bituminous composition contains pitch, sand, broken stones, "resin of American stone," sulphate of iron, and lime; another bituminous composition contains pitch, sand, pulverized coke, "puddler's offal," Meudon white, and fire-clay.

[Printed, 4*d*. No Drawings.]

A.D. 1865, January 31.—N° 273.

FLETCHER, Joseph, and HAMER, Daniel.—(*Provisional Protection only.*) "The application of hydro-electricity to steam "for the purpose of increasing its expansion and power, and the "machinery or apparatus connected therewith, and also the "application of galvano or frictional electricity for the same "purpose."

"In one arrangement for the application of hydro-electricity in "connection with steam for working steam engines, we place "between the cylinder and boiler a steam chest divided by a par-"tition into two compartments, and form in the partition a "number of holes, in each of which is placed a tube of iron. "The steam from the boiler passes from the first compartment "through these tubes and comes in contact with steel points "on a number of insulated steel bars in the second compart-

" ment, the effect of which is to set free a quantity of electricity " which combines with and expands the steam as it is passing " onwards to the valve box and cylinder of the engine. After " this combination of steam and electricity has passed through " the cylinder it is exhausted through a number of tubes into a " pipe or chamber in which there are steel points and insulated " steel bars for setting free more electricity, which is returned by " conducting wires to the before-mentioned steam chest, and " combines with the next supply of steam and the electricity " evolved therefrom, and then the combination with encreased " power passes to the cylinder and from thence to the exhaust " with its tubes, points, and bars, from which the electricity is " again returned to the steam chest, and so on continually, " thereby obtaining an encrease of power."

" When desired, instead of employing hydro-electricity, we " combine the electricity evolved from galvanic batteries or from " the ordinary friction machines with the supply and exhaust " steam, and thereby obtain an encrease of power."

[Printed, 6d. Drawing.]

A.D. 1865, February 9.—N° 362.

MARSHALL, William Alfred (*a communication from Jules Erckmann*).—(*Provisional Protection only.*) " A new or improved " insulating material for telegraphic and other purposes, together " with an improvement in protecting telegraph wires, especially " applicable to submarine and subterranean telegraphs."

" This invention consists in the employment of asbestos or " amiantus" [amianthus?] "(amiante) for insulating purposes. " To insulate telegraphic wire, for example, I take ordinary tele- " graphic wire, by preference of pure red copper, and surround or " coat it with asbestos or amiantus. The wire thus insulated may " be passed through a bath of resinous material or through " another insulating composition, or it may be protected in any " other manner by hemp, cotton, ebonite, or otherwise, this part " of the invention consisting in the obtaining of an insulation as " perfect as may be in and by the employment of asbestos or " amiantus. My invention also consists in protecting telegraphic " wire, especially for submarine and subterranean purposes, in " the following manner:—I protect and complete the insulation " of the wire previously covered with the asbestos or amiantus,

" as before described, by surrounding or enclosing it in a metal " tube, by preference of tin."

[Printed, 4d. No Drawings.]

A.D. 1865, February 18.—N° 461.

TREGASKIS, THOMAS PHILIP.—(*Provisional Protection only.*)

" The improved use of magnets in overbalancing weights."

The inventor proposes to obtain motive power by the use of " fixed and moveable magnets."

A series of magnets or pieces of soft iron are placed round the circumference of a wheel that revolves in a vertical plane, so that half of their poles face the centre of the said wheel and half face in an opposite direction; they are capable of being easily moved towards the centre, or in an opposite direction, and have catches that stop them at a certain distance from the centre. A stationary magnet or set of magnets is or are disposed in the same plane as that of the wheel, but form the " arc of a " circle, or any convenient curve," that is eccentric to the curvature of the wheel; the upper part of the stationary magnetic arc " may touch (if necessary)" the outer faces of the magnets that are uppermost on the wheel, the lower part of the magnetic arc being at some convenient distance from the faces of the sliding magnets in a lower part of the wheel. A similar set of stationary magnets are placed between the centre of the wheel and the inner ends of the poles of the sliding magnets; springs may supply the place of the inner set of stationary magnets. When the two sets of stationary magnets are used, " a continuous eccentric motion " is formed." By the " spring " arrangement " a semi-eccentric " motion is produced." " A continual overbalancing of sliding " magnets" " is thus produced," the magnets " being drawn " away from the centre of the wheel on the one side" of the said centre, " and towards the centre of the wheel on the other side " of the centre of the wheel." The power of the apparatus is " in " proportion to the" " weight of the sliding magnets."

[Printed, 4d. No Drawings.]

A.D. 1865, February 22.—N° 488.

WALKER, CHARLES VINCENT, and WALKER, ALFRED OWEN.—" Improvements in the construction of electro-magnetic " apparatus for railway signalling and other purposes."

"The invention consists in using one and the same electro-
" magnet to move an index into either of two positions, in either
" case locking or securing it in the position into which it is moved,
" and by the action of the same electro-magnet at the same time
" to strike a bell or gong, or not, as may be required, the two-
" fold or three-fold operation being effected by a single current of
" electricity of momentary duration, and for railway signalling
" purposes requiring only one telegraph wire for two (up and
" down) lines of a railway."

The actuating horseshoe electro-magnet of the instrument attracts a pivoted keeper, by the passage of an electric current through the telegraphic circuit; upon the cessation of the electric current, the said keeper returns to its original position by the aid of a spring; this keeper serves to lock the telegraphic mechanism as hereinafter described, and, by a stem surmounted by a hammer, to strike a bell. Two V-shaped permanent magnets (or one X-shaped permanent magnet) are pivoted between the poles of the electro-magnet, so as to produce the to-and-fro motion of the index by means of the polarity imparted to the poles of the electro-magnet, the keeper being pierced for the axis of the permanent magnets to pass through, and for the extension of the poles that act upon the said permanent magnets. A stud, carried by the armature, locks the permanent magnets upon the cessation of the current. The passage of the next current removes the stud, and permits the magnets to change position if a current be sent in the requisite direction.

A semaphore signal is used for railways, the axis of the arm being worked by a finger projecting from the axis of the permanent magnets. The weight of the arm causes its fall when no current is passing.

[Printed, 10*d*. Drawing.]

A.D. 1865, March 6.—N° 619.

VARLEY, CROMWELL FLEETWOOD.—" Improved apparatus for
" the protection of houses and property from burglars, parts of
" the invention being applicable for other purposes."

The object of this invention is to give notice to the police, or others, of the disturbance of any safe or door, by means of electric signals.

1st. The opening of the safe or door breaks an electric circuit, and causes a bell to ring at the police station; the house at which

the disturbance is caused is also indicated. As long as the circuit is complete, the lever armature of an electro-magnet at the police station is raised, so as to prevent the completion of the local circuit in which the bell is placed, and so as to preserve the shutter that indicates the house in a hidden position; but, when any breakage of the telegraphic circuit occurs, the local circuit is completed, the bell rings, and the shutter falls down and reveals its number.

2nd. An arrangement for indicating the particular safe or door that has been disturbed.—Indicators, fixed in a box, are included, in series, in the electric circuit, each indicator following its particular door in the circuit, and the battery being placed at the terminals of the circuit. When all the doors, &c. are closed, a short circuit at each door cuts out its indicator; therefore, upon opening any particular door, the breaking of the said short circuit actuates the corresponding indicator.

3rd. A voltaic battery.—Between the positive and negative solution of a Daniell's battery, a layer of oxide or carbonate of zinc is inserted. Any sulphate of copper that travels towards the zinc, is, by this means, converted into oxide of copper and sulphate of zinc.

4th. A terminal insulator for over-ground wires.—The wire to be terminated is inserted in "a bar of ebonite with a hole bored "across each end."

5th. Intermediate insulators.—A straight piece of solid ebonite is fixed to the pole, and the conducting wire is fixed to the ebonite. An ebonite hook may be "fastened to the under part of "the cross bar, so as to allow the conducting wire to rest in it." A third construction consists of forming a ring (in inverted insulators) slightly undercut to arrest the rain in its descent.

6th. "Improvements in the 'trembler bell.'"—The iron of the electro-magnet is encased in a closed circuit; this retards its magnetisation and de-magnetisation, and reduces the spark.

[Printed, 8d. Drawings.]

A.D. 1865, March 10.—N° 677. (* *)

REISSIG, Theodor (*a communication from Wilhelm Reissig*). (*Provisional Protection only.*) "Improvements in ascertaining "the presence of 'fixing' agents in photographic productions, in "removing the said fixing agents therefrom, and in apparatus "connected therewith."

"This invention relates, firstly, to a test whereby the operator „ is enabled to determine whether hyposulphite of soda or other " such fixing agent has been removed by washing or other process " employed in the practice of photography. With this view he " places the prints after they have been washed or otherwise simi- " larly treated, or the fluid in which they have been washed, in " communication with the poles of a galvanic battery, by which " means the fixing agent becomes decomposed, and sulphur (if " the fixing agent above mentioned has been used) appears at the " negative pole. If silver be employed for this pole the effect is " more apparent. As this part of the invention depends upon " the elimination of the injurious part of the fixing agent, it is " evident that it may be used for the removal of the last traces or " of larger quantities.

"Secondly, the invention relates to a mechanical method of " removing the said fixing agents. For this purpose the photo- " graphs are caused to rotate at a considerale velocity, so as to " throw off the liquid they contain by centrifugal force. The " apparatus proposed to be employed is a folding frame, covered " with latticework, and within which the photographs are placed " and then confined. This framework or cage is mounted upon " a spindle which is caused to revolve rapidly by a winch handle " or other ordinary means.

"The two parts of the invention may be combined, the test of " the former being applied between successive washings and " operations of the centrifugal apparatus."

[Printed, 4d. No Drawings.]

A.D. 1865, March 10.—N° 678.

COOK, Harry Whiteside (*a communication from Gaetano Bonelli*). — (*Provisional Protection only.*) "Improvements in " electric telegraphs."

"This invention relates to improvements in the Chevalier " Bonelli's well known system of typo-telegraphy."

"The signals are produced on prepared paper by means of an " electric current transmitted through the form of moveable " metallic types or characters," which are connected to the line wire, "and passed under two teeth connected with different poles " of two batteries, the two remaining poles of the batteries being " connected with the earth," "and so arranged that when the

"type comes in contact with either of the aforesaid teeth a circuit "is completed through the line, which at the receiving end is "connected by means of the receiving instrument with the earth. "The present invention (always using one wire only) substitutes "a second line of dots for the dashes of the Morse system."

One end of the types used in this invention carries the ordinary character, the other an arrangement of dots which constitute the corresponding telegraphic symbol.

The currents proceed down one tooth of the receiving instrument and up the other, but, as only positive currents mark, the direction of the current determines the line on which the dot appears.

"But in order to ensure greater clearness and certainty in the "production of the marks, the inventor purposes to adopt a "battery arrangement, such that the line shall be always main-"tained in a state of dynamic equilibrium." This arrangement "will replace the system of counter-currents used when the "system is marked with several wires."

[Printed, 4d. No Drawings.]

A.D. 1865, March 14.—N° 713.

BERTSCH, Auguste.—(*Provisional Protection only.*) "Im-"provements in apparatus for protecting telegraphic instruments "from injury from atmospheric or static electricity."

In this invention a fine wire is employed as the conducting wire between the line wire (or the earth) and the telegraph instruments; a discharge of static electricity burns this wire, and the instruments remain uninjured.

The apparatus is composed of a cylinder terminated at the ends by insulated discs, one disc being connected with the earth, the other with the instruments. Each disc is provided with an equal number of insulated spring hooks. "Fine wires are stretched "from end to end of the cylinder between the hooks on the disc." A helical spring constantly tends to rotate the cylinder. "The "bobbin is supported between two standards by a central axis," which is connected at one end with the earth, and at the other with the telegraph instruments by clips. The extremity of the line wire is held by a clip "which carries a contact piece, against "which the head of one of the spring hooks firmly rests. On the opposite side of the disc is a third clip communicating with

"the earth wire, and which also carries a contact piece. The "disc carries on its edge a plate of copper, which, when the last "of the fine wires has been burnt, rests on this contact piece," and joins up the telegraphic circuit. "The cylinder is formed of a "metallic tube carrying points which are retained at a very short "distance from the fine wires." When one of the threads is burnt, its spring hook is withdrawn into the disc, the cylinder turns on its axis, and the next hook comes up to the contact piece and places a new fine wire in the circuit.

[Printed, 4d. No Drawings.]

A.D. 1865, March 15.—N° 723.

CLARK, WILLIAM (*a communication from Pierre Etienne Lequesne*).—(*Provisional Protection only*). "Improvements in "electric piles and apparatus."

This invention consists of an arrangement of commutator by which the several elements of a voltaic battery may be suitably grouped in a prompt and easy manner.

The Provisional Specification describes and the Drawings show a wheel commutator, with metallic strips upon its non-conducting circumference so disposed that, in connection with insulated fixed springs attached to the battery terminals, two cells may be connected, either for quantity or intensity, according to the position of the strips in relation to the springs. The shape of the strips, and the fixed and invariable arrangement of the springs (in two rows), for the "four different methods of grouping the elements "of a pile of six couples" are also described and shown. The first method of grouping is "in a series;" the second "forming a "pile of three couples with double surfaces out of one of six "couples;" in the third, two couples with triple surfaces are formed; and the fourth "forms a single couple of the whole "pile."

"To shorten the cylinder it is simply necessary to place the "springs one on the other, two and two, instead of one beside "the other."

"This improved commutator is applicable to all kinds of electric "poles and other apparatus for the production or employment of "electricity in all cases where the effect may be modified by grouping the parts in manner analogous to an electric pile."

[Printed, 8d. Drawing.]

A.D. 1865, March 17.—N° 749.

DIBLEY, George, and BRABY, Frederick.—" Improve-" ments in posts or supports for telegraph wires, also applicable" to posts or supports employed for other purposes."

1st. " Constructing posts or supports of a number of iron bars" or bands, angle, tee, or other iron, fixed or secured at certain" distances apart round a series of rings or hoops of a circular," square, or other suitable form, to the bottom ring or hoop of" which is fixed or fitted a base plate of any suitable known" form."

2nd. "Forming posts or supports, constructed as above de-" scribed, of two or more separate lengths, so proportioned that" the upper length or lengths may be placed inside the lower" length or lengths for facility of transportation."

3rd. " Constructing the base plates to posts or supports."

The Drawings show the following arrangements :—

A number of half-round bars are rivetted to a series of circular rings of gradually-diminishing diameters, the terminal rings being of greater depth than the others. Three hooked radial bars are attached to the bottom ring and to a large ring, thus forming a base. When more than one length is required, the lower ring of the upper length is keyed to the top ring of the lower length. The cross section of the rings may be other than circular, and the bars may be flat or of angle iron.

The bracket for holding the telegraph wires is keyed into the top ring of the post.

In other constructions, the rings have holes or notches corresponding in number to the bars. Outer rings are driven over the notches.

A base plate may consist of a solid plate having a central aperture corresponding to the outer diameter of the bottom ring to which it is keyed.

[Printed, 10d. Drawing.]

A.D. 1865, March 20.—N° 775.

BROWNING, Arthur Giraud.—" An improved socket for" fencing and telegraph posts."

" The invention consists in casting such sockets in one piece" with a spear head point or spike having two or more flanges, so" that the sockets can be driven into the ground and will form a

" a good hold for the post or pillar. The internal form of the socket " will correspond with the section of the post or pillar, whether " circular, flat, square, triangular, L, T, or other shape. The " number and form of the flanges may be varied to suit the nature " of the soil into which the sockets are to be driven, but in most " cases I prefer what may be termed a cruciform section, that is a " spear point with a flange running down the centre on each side, " having also a horizontal disc near the top (cast in one piece with " the socket) to prevent the possibility of the socket sinking after " it has been driven home."

The Drawings show certain sockets for fencing, and a socket " having a trifoliate spear head tapered downwards and adapted " to support a telegraph post." The socket is cast in one piece with a horizontal flange " (cup-shaped or otherwise) at or near the " top," and with a spear-head point. The telegraph post itself is shown to consist of a capped tube of circular cross section tied down to screwed lugs on the socket by iron wire rope.

[Printed, 10*d*. Drawing.]

A.D. 1865, March 21.—N° 787.

ARTHUR, WILLIAM.—" Improvements in compasses or apparatus for registering the course steered by a vessel during any " given period."

A suspended framing carries a registering cylinder, free to turn on its vertical axis by the action of a magnetic needle presently to to be described. Parallel to the axis of the said cylinder a screw shaft is mounted, and is rotated at a given speed by means of clockwork; the marker or pencil is fitted in a carriage that descends in accordance with the motion of the screw, guide rods being attached to the framing to permit of the accurate motion of the said pencil carriage. A cam groove, in the upper part of the screw shaft, alternately raises and lowers the magnetic needle, by the intervention of a lever, which raises and lowers a vertical shaft concentric with the registering cylinder but above it, the said vertical shaft being pointed at its upper extremity so as to act (when risen up) as the pin on which the magnetic needle turns; when the vertical shaft is depressed, it deposits the card of the magnetic needle on the upper part of the framing in the position that it naturally assumed when pivoted. When the needle has been left on the roughened surface of the framing, the shaft still continues to descend, and is then made to turn in accordance with the posi-

tion of a double inclined plane on the under surface of the compass card, a roller on the said shaft riding on one or other of the inclined planes until it arrives at the lowest point; a guide plate and pins communicate the rotary motion of the upper vertical shaft to the registering cylinder and thereby cause a horizontal line of a greater or less length to be traced on the paper.

[Printed, 1s. 4d. Drawings.]

A.D. 1865, March 23.—N° 825.

TIDMAN, Robert.—(*Provisional Protection only.*) "Improve- "ments in machinery or apparatus for paying-out and for "raising electric telegraph cables in deep waters."

To a raft or floating platform, which has great buoyancy in consequence of divisions on its under surface, lee boards are attached; the said lee boards also act as a helm. A series of lighter rafts are connected to the floating platform; they are also furnished with lee boards, and carry horizontal rollers and rack pulleys to conduct the cable to the sea in a central manner; these lighter rafts are only used for paying-out cables.

"The cable to be payed out has one end fastened to and is "then coiled upon the principal raft or floating platform, and "then a casing is built over it. In the top of this casing rollers "are placed, between which the end of the cable passes out on to "and over the rollers of the lighter rafts or sea cradles, on which "rafts are also guide rollers to prevent the cable leaving them. "The principal raft is towed by a steamer or steamers, and the "cable runs freely out of the casing and over the roller rafts "into the sea; the light rafts trailing behind the principal raft "will readily sink to a certain extent should any sudden or great "strain tend to come upon the cable, and the strain being this at "once yielded to the cable cannot by any possibility be injured."

"To raise cables previously sunk it is only necessary to fix a "steam engine upon the principal raft or floating platform, and "wind the cable up in the opposite direction to that in which "cables are payed out from the same."

[Printed, 4d. No Drawings.]

A.D. 1865, March 25.—N° 847.

GORDON, Alice Isabel Lucan.—(*Provisional Protection only.*) "Improved means of communication between the passengers.

"guard, and engine driver of a railway train, part of which said "improvements is also applicable for the prevention or detection "of burglary."

The roof of each carriage is furnished "with a small electric "machine provided with a burner enclosed in a strong blue (or "other colored) glass frame; this burner may be either a char- "coal point or any other combustible substance which can be "ignited by electricity." Each compartment of each carriage is "furnished with "a button," or "contactor," or other means of completing or interrupting the electric circuit. A bell in the guard's van is also included in the electric circuit, and a disc (bearing the number of the carriage whence the signal proceeds) is exhibited at the same time. A foot board and railing enables the guard to proceed to any required carriage. By means of another button, "the guard can reverse the current," and thus ring an electric bell or exhibit a light on the engine. "The "guard's van is also provided with a similar arrangement." When the battery is composed of vessels containing liquids it should be mounted on pivots. A reversible reflector and box enables the light to be visible by day as well as by night.

To prevent burglary the door of the safe, or the door or window of the room, is provided with a "contactor," so that, upon the door or window being opened, a brilliant light is shown upon the exterior of the building; an electric bell may be sounded at the same time.

To protect important buildings, the electric communicating wires may be laid to the police office, and thus (in the event of burglary) enabled to sound an electric bell there, and to show the name or number of the building on a disc.

[Printed, 4d. No Drawings.]

A.D. 1865, March 31.—N° 910.

BONNEVILLE, Henri Adrien (*a communication from Albert Auguste Daussin de Nalinne*).—"Improvements in tele- "graphic apparatus."

This telegraphic system allows "of calling and corresponding "directly between all the stations of the same circuit with a "single line." The apparatus are placed in a continuous circuit, and the bell at any particular station (to the exclusion of the others) is caused to ring by the simultaneous advance—in all the

line-wire apparatus—of a cam, disposed in a way peculiar to each station, which is instrumental in closing a local circuit by which the bell is sounded. The said cam depends directly or indirectly upon the pointer axis. The electro-motive battery of the telegraphic system is, during the inactivity of the apparatus, counterbalanced by "a resisting pile" placed in the station at the opposite end of the line; to set the apparatus to work, the "resisting pile" is put to "earth" by means of a finger key. Any particular line-wire apparatus is caused to work by means of currents sent in the opposite direction to those employed for setting the bell in movement, an electro-magnetic relay with steel armature, and "a pile placed in an extreme station" being employed. A perfect accordance between all the line-wire apparatus is ensured by a means of automatically placing the pointer at the cross—wheelwork, an electro-magnet, or a magnetised needle being employed for this purpose. The manipulator of a Morse apparatus is composed of a cylinder with conducting and non-conducting portions; a pedal and spring sets the cylinder in motion. The relay may be replaced by a second line wire. The "calling" apparatus may be separate, and applied to other telegraphs.

[Printed, 1*s*. Drawing.]

A.D. 1865, April 5.—N° 960.

MILLAR, Adam.—(*Provisional Protection only.*) "Improvements in certain electric telegraphs, part of which invention is "applicable to other purposes."

1st. Communicating motion to shafts, and other rotative appliances, by means of a weighted "Huygens's endless chain." The chain is prevented from slipping "by means of weights acting "on the chain on both sides of the shaft or pulley, in addition to "the weight which produces the motion of the shaft."

2nd. 'Compensating for the variations from the proper "speeds" of telegraphic instruments, without influencing the "continuously-moving parts," by communicating backward or forward motions to other parts of the instruments.

3rd. Producing the said compensating motions by means of electro-magnets and suitable gearing. The electric currents employed may either be additional to or form part of those which produce the message.

4th. Indicating "the variations from the proper speeds of the "instruments by the non-regularity in the actions, produced by "means of electric currents, or by the non-regularity of periods "of no action corresponding to periods of no current."

5th. "Transmitting messages through one line wire by means "of proper surfaces in the form of symbols or characters "arranged in a row;" a copy of the said row is produced at the receiving station. The instruments employed are similar to those having "five conducting points," described in No. 12,352 (Old Law).

6th. "Transmitting messages though one line wire by means "of proper surfaces consisting of lines of various lengths "arranged in one line," and "producing the message at the "receiving station in the form of symbols or characters." The said lengths send the currents "by any of the usual methods;" the recordings are produced by a receiving instrument similar to that referred to in the 5th improvement.

[Printed, 4*d*. No Drawings.]

A.D. 1865, April 6.—N° 975.

WATSON, John Samuel, and HORWOOD, Albert.—(*Provisional Protection only.*) "Improvements in conducting "electricity for communicating or transmitting signals and "alarms in the event of burglary, fire, railway accidents, and "other purposes."

According to this invention, the signals are conveyed between "an iron safe, house, ship, door, window, drawer, or room and "the sleeping apartments," also "between railway passengers "and guards." A burglary alarm may be given from the door, window, &c., opening and closing; an insulated metal washer is employed in combination with two metal tubes, one working within the other, and a spiral ring, to make and break the electric contact. An air thermometer gives the alarm in case of fire; the centre one of three chambers is partly filled with quicksilver, which on undue elevation of temperature is acted upon by the expansion of the air, and rises into the top chamber, where it completes the circuit of an electric bell and battery by making contact between two insulated wires in the said circuit.

The arrangements for conducting consist "of one, two or "more metal tubes placed one within the other, the interior of

"such second metal tube being insulated." One or more insulated wires are placed in the interior of such second metal tube, "both ends of such wire or wires being connected to both "ends of the exterior metal tube, both or all acting together and "governing one conductor, and the other second or interior "insulated metal tube as the other conductor." If the conducting metal tubes and wires are cut or damaged, a signal is "given by "the circuit of electricity being made complete."

[Printed, 4d. No Drawings.]

A.D. 1865, April 8.—N° 1012.

MOORE, Siegmund.—"Improvements in electro-magnetic "engines."

"The engine consists of four pillars or standards on a founda- "tion or bed plate supporting a table on which the moving parts "are supported in two bearings or journals by the driving shaft, "a space being formed in the centre of the table for the working "of the fly wheel. The driving shaft extends beyond the width "of the table and carries at each end a crank set reverse to each "other." One set of electro-magnets is fixed on to the bed plate; another set is fixed, at a higher level, upon pillars erected upon the said bed plate. The armatures to these electro-magnets are capable of sliding upon vertical slide rods that have flanges fixed at different relative heights upon them; it follows, therefore, that if the electro-magnets be brought successively into action, by means of a suitable commutator actuated by the driving shaft, the armatures will be in turn attracted, and will communicate continuous motion to the cranks of the driving shaft, by means of connecting rods attached respectively to the vertical slide rods. The commutator consists of blade springs that are fixed underneath the upper table of the engine; these are depressed, at suitable relative times, by means of "depressors" or projections keyed on to the crank shaft. One of the extremities of each wire of each electro-magnet is attached to one battery pole, and the other pole is brought into contact with the other extremities in succession. Four series of electro-magnets are described and shown, but eight series may be arranged on the above-mentioned principles.

[Printed, 8d. Drawing.]

A.D. 1865, April 11.—N° 1031.

NEWTON, William Edward (*a communication from Jean Lucien Arman*).—" Improvements in the construction of sub-
" marine telegraph cables, and in the mode of submerging or
" laying them in the water."

" In order that the cable may be both light and strong, the in-
" side or core is to be constructed of hemp." " One or more
" electric cables " are wound helically round the said core, " so
" as to form a kind of coiled spring, which will allow of the cable
" stretching to a certain extent, and also bending in any direction
" according to requirement. Then in order to protect the cable
" from injury, and give it sufficient floating power, it is covered
" with Indian hemp or such like material to any desired thick-
" ness."

" It will be easily understood that as a cable thus formed will
" float and give in any direction, it admits of being readily trans-
" ported from place to place, and placed in position. In doing
" this (which forms the second part of the invention) the cable is
" not allowed to float on the surface of the water, as that would
" expose it to injury and impede navigation, neither is it laid at
" the bottom of the water, but it is sunk to a convenient depth
" (say from 100 to 150 feet), so as to be out of the way of vessels
" and from all other injury, and yet easily displaced or removed
" when required for repairs or other purposes. This is effected by
" attaching weights to it at suitable distances as it is unwound
" from the vessel and laid in the water."

Floating buoys or lighthouses may be attached to the cable.

[Printed, 8*d*. Drawing.]

A.D. 1865, April 19.—N° 1088.

JONES, Ralph Augustine, and HEDGES, Joseph.—" Im-
" provements in and apparatus for communicating intelligence
" by means of electricity."

This invention principally relates to the "commutator" or sending instrument in a telegraphic circuit, and consists of a substitute for the " key commutator " now employed in a Morse telegraphic system. Certain pieces of metal are inlaid in a slab of wood, and are so connected with a source of electricity that,

by passing a "style" over them, in which is inserted a wire or wires connected with the electric circuit, electric contact is made, and a certain series of electric currents is thereby sent to the distant station.

The pieces of metal are disposed in rows, each row signifying a letter, and the said pieces being of such relative dimensions that the comparative duration of contact with each piece will signal the letters according to the "Morse alphabet."

To diminish the time of sending a message, in addition to the "dot" and "dash" of the Morse alphabet, a still longer stroke may be employed.

In one "style" (or "make and break" pen), two insulated wires, one connected to the line wire, the other to the receiving instrument, pass through the centre and ordinarily are in contact near the spring point, thus allowing messages to be received, but, when pressed upon the tablet, the wires separate, and suitable battery currents are sent to the distant station.

In another plan, a switch takes the receiving instrument out of circuit, and a pen, with a single wire connected with the line, is used to bring the battery into the telegraphic circuit.

Either a single or a "divided" battery may be used.

The simplest tablet consists of two metallic pieces connected with opposite poles of a divided battery, and worked by taps or touches.

[Printed, 10*d*. Drawing.]

A.D. 1865, May 4.—N° 1251.

LILLEY, JOHN.—"Improvements in ship and other compasses."

In compasses made according to this invention, the magnets are "suspended in spirit or other suitable liquid, while the card "or indicator is suspended in a separate chamber."

In one arrangement, two magnets are applied to the lower surface of a dome suspended on a pivot in the spirit, "and from "this dome a fine stem rises through the vessel containing the "spirit to support the card or indicator in the chamber above."

In another arrangement, the chamber containing the liquid is entirely closed, and the magnets pivoted therein act by the exercise of their magnetic influence through the chamber on an external magnet applied to the under side of the card, which is pivoted immediately above the magnets in the chamber, but in a

chamber external and unconnected to that containing the spirit. The lower needle is made of sufficient magnetic power to entirely control the upper one, which has its poles in consequence reversed.

"The needle or bar or bars in the spirit or other liquid may be
" acted upon through the chamber by a rod or shaft, and arms
" or levers, and screw or other adjustment by which they may be
" raised off their pivot, and the upper portion of the cone pressed
" against a corresponding conical or other suitable support pro-
" vided for the purpose, and there held when desired."

[Printed, 10d. Drawing.]

A.D. 1865, May 18.—N° 1368.

FAUCHEUX, Theodore (*a communication from Henry Brandon*).—" Improvements in rotary magneto-electric machines."

" The object of the invention is to facilitate the collection of
" the electrical currents generated in the movable parts of the
" machine, so as to direct them immediately through a fixed con-
" ductor, and thence to transmit them to a given point. For this
" purpose I lead the current from each coil or group of coils by
" means of a conducting wire to a piece of metal, the general
" receiver of the electricity on the revolving axis carrying the
" discs, but which is insulated from the shaft as well as from its
" bearings, and from all other objects, except at the point where
" a fixed insulated conductor is in contact with the revolving
" piece of metal in such a way as to unite all the separate currents
" into one."

In the Drawing, the shaft carrying the discs is shown to be surrounded for a portion of its length by a gutta percha cylinder. Outside of this insulator, and insulated from the shaft, a piece of metal is fixed, which works in an insulated lubricating box, and receives the current from the coils of the machine. The current is conducted off from the apex of the lubricating box, by means of a wire attached to a binding screw, to any required point.

[The exit of the electric force from only one of the poles of the apparatus appears to be provided for by this description, but it is doubtless to be inferred that the shaft itself forms the other pole. As the currents alternate in the ordinary arrangement of the magnets and keepers, this apparatus necessarily furnishes only alter-

nating currents, and therefore can scarcely be said to "unite all "the separate currents into one."]

[Printed, 8d. Drawing.]

A.D. 1865, May 18.—N° 1376.

VARLEY, Samuel Alfred.—(*Provisional Protection refused.*) "Improvements in the insulation of electric telegraph wires."

"This invention has for its object an improvement on the "insulator commonly known as C. F. Varley's double V-insu- "lator."

"In the double V-insulators usually constructed the upper "portion of the inner cup where it is cemented into the outer "earthenware cup, and the upper portion of the outer earthen- "ware cup where it is cemented into the iron hood, are generally "made taper and grooved both internally and externally;" the grooved portion is, in consequence of the warping of the clay or of carelessness in manufacture, often of an irregular figure, and unable to bear the strain of the iron hood and of the telegraph wire placed on the top thereof.

"My improvement consists in making the earthenware cups "with bands at the top and bottom of the upper portion of the "cups. The effect of this is to counteract any irregularity in the "shape and to insure the full advantage of the length of the "fitting." The cement for putting the insulators together that is preferred, consists of asphalt, shellac, India-rubber, and sometimes sand "or other suitable powder." The outer earthenware cup is cemented into an iron hood. "I prefer to make all the "fittings parallel, as shown in the Drawing, instead of taper as "is frequently done with the ordinary double V-insulator."

[Printed, 6d. Drawing.]

A.D. 1865, May 20.—N° 1390.

VARLEY, Cornelius, and VARLEY, Samuel Alfred.— "Improvements in telegraph supports, parts of the invention "being applicable to other purposes."

"An important feature of our invention is that the power to "resist strain is in a great degree independent of the rigidity of "the upright."

The pole itself consists of ordinary gas barrel, on one end o which a four-sided taper foot piece is cast; this termination is fitted into a hole in a square cast-iron ribbed base plate.

"A part of this invention consists of a novel kind of mooring; "this mooring is of such a shape that it can readily be forced "into the ground, and is of such a construction that on being "submitted to strain it opens in a similar way to a hinge or a "pair of scissors, presenting a broad surface, and offering a great "resistance to movement."

The insulators are supported upon an "arm piece" cast on to the upper portion of the gas barrel; the arm piece receives a wooden arm which carries the insulators.

The stay wires, one for each mooring, are threaded through an "iron cage," that may be keyed at any desired position on the gas barrel. Several methods of arranging the stay wires are set forth, and shifting stay pieces may be employed instead of the cage.

Where wires terminate, the poles are constructed of two uprights, and the wooden insulator arms act as braces thereto; increased rigidity is obtained by bars placed lower down. The arms may project beyond the uprights, and the stay wires may be attached to them.

[Printed, 1s. Drawing.]

A.D. 1865, May 23.—N° 1412.

WILDE, HENRY.—(*Provisional Protection only.*) "Improve-"ments in the production and application of electricity."

1st. An improvement in the electro-magnetic induction machine described in No. 3006 (A.D. 1863).—"A short circuit is "made between the coils of the small magneto-electric machine "and the coils of the electro-magnet of the electro-magnetic "machine whenever the commutator on the axis of the armature "of the small magneto-electric machine is at the dead point." "The large armature of the electro-magnetic machine is enve-"loped with coils made of sheet copper the whole width of the "armature;" "the coils are insulated from one another by "means of a sheet of cardboard" "of the same length and "width as the sheet of copper," and coiled on the armature at the same time.

2nd. "The application of the electro-magnetic machine de-"scribed in the before-mentioned Specification to the heating, "rolling, coiling, and welding of metals."—The metal is made to pass in succession through two sets of rollers, one set being

connected with one pole, the other with the other pole of the machine; the metal extended between the rollers thereby becomes highly heated, and is rolled, welded, or coiled as required.

3rd. The application of the magneto-electric machine described in No. 516 (A.D. 1863), or the electro-magnetic machine described in No. 3006 (A.D. 1863), to the prevention of the fouling of ships' bottoms.—One polar terminal "is connected with "the metal bottom of the ship, and the other polar terminal is "connected with one or more plates of metal surrounding the "ship, but insulated from it by wood or other suitable material."

[Printed, 4d. No Drawings.]

A.D. 1865, May 27.—N° 1457.

BROOMAN, RICHARD ARCHIBALD (*a communication from Jacques Paul Lambrigot*).—"Improvements in reproducing or "producing copies of writings, drawings, music, and other "characters, and in preparing originals to be transmitted by "electric telegraph."

The following are the heads of the invention :—

1st. "Preparation of a metallic paper."—A thin sheet of tin, coated with paste, is applied, by pressure, upon a sheet of ordinary paper. When the paste is dry, the metallic side of the compound sheet is placed in contact with the grained surface of a steel plate, and the whole is passed between rolls, thus graining the tin paper.

2nd. "Chemical preparations and first reproduction on or- "dinary paper."—The metallic surface of the tin paper is coated with a thin layer of essential oil, dried, and a sheet of white paper is applied thereon; the said white paper is impregnated with "azotate of ammonia," "yellow prussiate of potass," and dextrine. When the design is traced on the white paper, by means of an iron positive electrode,—the tin being the negative electrode —the said design appears blue upon a white ground.

3rd. "Second reproduction on metal."—The white paper having been removed, "the electrized tin sheet" is treated with a decoction of nut galls that contains a small quantity of "azotic" acid. By degrees a whitish product marks the design, which is fixed by heat and the use of an alkaline solution.

4th. "Analysis."—The tin having been oxidised by the positive pole, and (at the lines of the design) further oxidised by the acid,

is precipitated as stannic acid, and fixed to the metal by the joint action of the gall water and the desiccation.

5th. Coloration of the design on the metallic sheet.—A solution of sulphate of iron, or fatty varnish, or ink, is used for this purpose; or the tin sheet may be placed on a hot iron plate—being kept damp during the process—to bring out a good black.

[Printed, 4d. No Drawings.]

A.D. 1865, June 2.—N° 1518.

BROOMAN, Richard Archibald (*a communication from Jean Theodore Scholte*).—" Improvements in electro-magnetic " clocks and other timekeepers."

In this invention, " the electric current only exerts its action " when the pendulum is reduced to a fixed minimum of oscil- " lation."

To obtain the impulse at the moment of the minimum of amplitude, certain mechanism is arranged at the extremity of the pendulum. On suitably-fixed columns a double lever is arranged, the centre column supporting the said lever; one of the outside columns acts as a stop, the other to make electric contact and thus to actuate an electro-magnet. Under ordinary circumstances, the single tail of the double levers is kept in contact with the stop by means of a helical spring, but, when the amplitudes of oscillation of the pendulum have diminished so far that a readily-movable pin, on the extremity of the said pendulum, is prevented from sliding over centain notches at the extremity of the upper part of the active arm of the double lever, the said active arm is depressed, and the electric circuit thus established enables the electro-magnet to act upon an armature at the extremity of the pendulum, and thus to ensure the continuance of its oscillations.

To communicate these independent oscillations of the pendulum to the clockwork, certain mechanism at the upper part of the pendulum is employed. At each oscillation the displacement of a lever acts upon an arm and a spring, and thus causes the advance of one tooth of a wheel. An endless screw, on the axis of the said wheel, gears into another wheel, which completes one revolution per hour.

For ordinary timekeepers spring contacts are arranged at the extremity of the pendulum, or at a less height.

[Printed, 1s. Drawings.]

A.D. 1865, June 5.—N° 1541.

NEWTON, William Edward (*a communication from William Augustus Leggo and George Edward Desbarats*).—" An improved " photo-electrotyping process."

A photograph on glass is varnished, allowed to dry, and laid upon a level slab in a dark room; it is then brushed over with " a substance which upon exposure to the light becomes in- " soluble in water," and the coating is permitted to " stand until " it be quite jellied." The sensitive substance employed is a gelatinous solution of bichromate of potash. When coated, the picture is exposed " to the light face downwards " for the requisite time, and the soluble parts of the jelly removed with warm water. Before the remaining part of the jelly is dry, a plaster cast is taken from it.

To produce an electrotype from the said cast, it is dipped into hot water and laid face upwards until all superfluous water disappears; then, while still warm and damp, dipped into melted wax two or three separate times, " allowing the wax to set each " time." The waxed cast being placed face downwards in some hot wax that has been poured upon a metal plate, and allowed to cool, " the wax upon the plate will unite with that upon the cast " and will form a solid mass, from which the plaster may be lifted " away leaving its exact impression in the wax, which when coated " with plumbago will, by the usual process, yield an electrotype " from which perfect copies of the original may be printed."

If desired, a stereotype may be made from the plaster cast as it comes from the gelatinous surface.

[Printed, 4*d*. No Drawings.]

A.D. 1865, June 5.—N° 1543.

GORDON, Alice Isabel Lucan.—" An improved system of " telegraphic communication on railways, parts of which invention " are also applicable to other telegraphic purposes."

This system is worked by means of electric force, and is comprised under the following heads :—

1st. The communication of passengers with guards and engine drivers.

2nd. Indicating to the guard the carriage from which the signal has been given, and enabling him to reach it.

3rd. The communication of guards with each other and with the engine driver.

4th. Indicating the position and speed of trains.

5th. Signalling from a station to a train, or from a train to a station.

6th. " A means of preventing or detecting burglary."

The electric bell used for this invention consists of a lever armature to an electro-magnet, which, on the completion of the electric circuit, releases the hammer lever and allows it to fall on the bell. In another arrangement, the falling of the hammer withdraws the armature.

In each compartment is placed a tassel and " detector;" the pulling of a cord, by means of the tassel, causes an index to fall and show that the tassel has been pulled.

Three insulated wires form a rope and are fixed to each carriage; they are joined (in the train) by means of insulated loops.

The pulling of the tassel also elevates an external disc.

A central rail, broken at certain intervals, and suitable electric connections, provide for the accomplishment of the 4th and 5th heads of the invention.

In the detection of burglary, the opening of a door or window causes the exhibition of an electric or other light, and, at the same time, rings an electric bell.

[Printed, 1s. 4d. Drawings.]

A.D. 1865, June 5.—N° 1544.

KENNEDY, James.—" An improved method of submerging " telegraphic cables."

In this invention the cable is submerged by suspension.

The cable consists of copper wire surrounded by an insulating material, and is made so as only just to sink in sea water; therefore no undue strain is exerted upon the suspending cords or chains. To reduce the specific gravity of the cable, floats may be attached to it at certain distances, the said floats being made of a hollow cube of vulcanised India-rubber filled with cork; or the cable may be made with a tubular covering, and the space between the said covering and the cable filled with cork dust. Instead of using buoys floating at the surface of the water, " the suspending " lines may be made in a tubular form, and themselves contain " the buoyant principle." " It will of course be understood that

"the distance apart of the buoyant tubes, their diameter, and the "quantity of cork dust which they contain, must be so propor- "tioned to the weight of the length of cable which each has to "support that it will float in a perpendicular position in sea "water with its upper end just appearing at the surface."

Amongst the advantages of this method of submersion, "the "use of a floating telegraphic station between the two coasts," is mentioned.

The Drawings show "portions of a telegraphic cable suspended "at three different depths (say), fifty fathoms, one hundred fa- "thoms, and two hundred fathoms."

[Printed, 8d. Drawing.]

A.D. 1865, June 14.—N° 1609.

BRAE, ANDREW EDMUND.—"Improved means of conducting "electric currents through railway trains, and of actuating signals "or alarums therein."

1st. Certain improvements on the "mercurial joint" described in No. 2007 (A.D. 1863).—A light plug, covered with India-rubber, is substituted for the iron pin; the said light plug entirely fills the socket, and yet easily slides within it. The flexible conductor is carried through the interior of the said plug and handle, and a portion of it protrudes at the end, so as to be immersed in the mercury when the plug is pushed home.

2nd. Applying the plug and socket joint to both ends of the pendants alike.—The carriages have sockets at both ends, instead of at one only, and the pendants are all removeable. Some of the pendants have conductors of considerable length, so as to bridge over any carriage that is unprovided with sockets.

3rd. The discharge of the signal.—Instead of depending upon the weight of the armature of the electro-magnet to free it from the magnet and actuate the signal, the said weight is counterpoised and the separation of the armature is effected by means of a "Salter's spring balance." The counterpoise of the armature is fixed to a chain that passes over a fixed pulley, and to an independent arm that radiates from the same centre as the arm does that supports the armature. To the axis of the latter fixed arm a pulley is fixed that communicates motion to the plug of the steam whistle when the armature is no longer in contact with the electro-magnet.

[Printed, 8d. Drawing.]

A.D. 1865, June 14.—N° 1612. (* *)

MULLEY, WILLIAM ROBINSON.—(*Provisional Protection only.*) "Improvements in sheathing iron ships." "For this purpose I "first sheath the bottom of the ship with wood, the wooden "planking being secured by rivets or screws or in other con- "venient manner. Over the wooden sheathing I place a sheathing "of sheet iron (either entire, perforated, or in bands), and over "this again I place a sheathing of zinc. The iron and zinc sheets "may be punched through together and nailed at the same time "on to the wooden sheathing beneath."

[Printed, 4*d*. No Drawings.]

A.D. 1865, June 16.—N° 1628.

HENRY, MICHAEL (*a communication from Sarah Martha Buckwell*).—"Improvements in the method of and apparatus for "effecting and recording telegraphic communications."

1st. The communication of intelligence by means of a set of shutters mounted in a skeleton framework and worked by cords. The characters used are similar to those employed in electro-telegraphy, "in which an alphabet or code of signals is composed by "various combinations of dots and lines."

2nd. "Improved apparatus or manner of operating electric "telegraphic printing or recording instruments."—The message is set up in suitable type, which actuates "a signalling lever, lever "key, or transmitting arm; or the characters used in ordinary "typography may be employed for printing, so that a copy of the "message may be printed in both telegraphic and ordinary "characters, and retained by the sender. The type may be set "up in a line or composing stick, or it may be arranged spirally" [helically?] "round a cylinder, and caused to traverse the current "breaker, so as to work it and transmit currents through the "wire of such duration and at such intervals as shall correspond "with the message transmitted. The characters indicated by the "receiving instrument are so formed and spaced as to produce a "counterpart (in respect of proportion) of the type employed." "This improvement is particularly applicable for transmitting "reports to various localities in succession, or on separate wires "at the same time."

[Printed, 8*d*. Drawing.]

A.D. 1865, June 20.—N° 1654.

BAGGS, Isham.—(*Provisional Protection only.*) "Improve-"ments in electric telegraph instruments and relays."

1st. "Practically neutralising the effect of gravity or magnetic "attraction in telegraphic instruments and relays by means of "independent electric currents, which increase the delicacy or "velocity of action in the moving parts of the instrument." The vertical electro-magnet is wound with two distinct and independent coils, one round the upper part, the other round the poles. The current from a local battery traverses the upper coil and nearly attracts the armature; the under coil forms a part of the telegraphic circuit, and whenever a current traverses it the armature is attracted, only a small additional force being required for the purpose. Other methods of carrying out this principle are set forth.

2nd. An "electro-meter."—An electro-magnet, excited by a local battery, is free to act upon a suspended helix, when the line-wire current traverses the said helix. In this and the previous improvement, permanent magnets may be used in place of a local current.

3rd. "The employment of secondary currents for facilitating "the release or return of attracted, deflected, or movable bodies "generally under the influence of magnetism or electric currents." The needle is deflected by the electric current through the primary coil of an electro-magnet; when the said current is broken, the reversed current then flowing through the secondary coil returns the needle to its normal position. The like effect may be caused by contacts with a local battery.

4th. "Increasing the conducting power of wires and coils and "the magnetism of magnets by surrounding the apparatus with "ice." The ice is placed in a thin hollow metal casing, covering the apparatus, and surrounded by non-conductors of heat.

[Printed, 4*d*. No Drawings.]

A.D. 1865, July 3.—N° 1753.

BAGGS, Isham.—(*Provisional Protection only.*) "Improve-"ments in submarine telegraphy, which improvements are also "applicable in some cases to land telegraphy."

"Certain arrangements whereby the prejudicial effects of induc-"tion and earth currents" "are avoided, counteracted, destroyed,

"or superseded, and whereby the disturbing effects of atmo-"spheric influences are also nullified."

"Two electrically opposite influences are excited and caused to "operate" in the cable "in opposite directions at one and the "same time." "One half of the pairs of plates" of the voltaic battery employed to work the telegraph "are placed in commu-"nication with one end of the cable, and the other half of the "pairs of plates at the other end thereof."

To avoid the prejudicial effects of earth currents, &c. "a duplex "system of conductors whether arranged as wires, coils, or other-"wise may be employed." The steel wires outside the cable are connected at each end with certain "balancing coils" whose free terminations are in connection with the earth. By this arrangement the earth currents are caused to circulate through the balancing coils in an opposite direction to that which they take through the inducing coils, and therefore tend to balance each other. In order that the earth currents may balance exactly, the steel wire is "caused to bifurcate, and the two branches of such "wire respectively to communicate with platina plates, or other "conductors immersed in dilute sulphuric acid; such plates "being made to communicate with the earth by means of a plate "analogous to an ordinary earth plate."

[Printed, 4d. No Drawings.]

A.D. 1865, July 6.—N° 1784.

THOMSON, William, and VARLEY, Cromwell Fleetwood.—"Improvements in electric telegraphs."

1st. "The arranging telegraphic apparatus to send auto-"matically into the circuit in rapid succession three or a greater "number of currents or shocks of equal strength and properly "proportioned" "to produce at the receiving end a single current "or shock."

2nd. "The arranging telegraphic apparatus to send auto-"matically into the circuit four or a greater number of currents "or shocks (of equal or unequal strengths), properly proportioned" "to produce at the receiving end a single current or shock."

3rd. "The arranging apparatus for transmitting electric currents "into a telegraphic circuit."

This invention is especially applicable to long submarine lines.

This automatic finger key sends three or more alternate currents into the line wire to produce a single current at the receiving

station; the first current corresponds in sign to that desired to arrive at the distant station; the duration of the second current is greater than that of the first, and the duration of the subsequent currents decrease from that of the second current. The apparatus consists of an axle, driven at a uniform rate, carrying cams, which do not rotate with the said axle until the depression of a finger key. The depression of a finger key and the rotation of the corresponding cam sends the requisite currents (in sequence and duration) into the line wire to produce a given single current at the distant station, the projections of the cam being proportioned accordingly, and acting on suitable contact springs. An apparatus to send "Steinheil signals" is shown in the Drawings, and a method of equalizing the friction (whether the cam be running or not) is set forth.

This invention is analogous to that described in No. 529 (A.D. 1858), but gives greater speed in transmission.

Many details are set forth in this Specification.

[Printed, 10d. Drawing.]

A.D. 1865, July 6.—N° 1791.

SWAN, JOSEPH WILSON.—"Improvements in the production "of printing surfaces by photographic agency, and in obtaining "prints therefrom."

"Photo-mezzotint printing."—When the image is produced by means of a negative, bichromated gelatine and colouring matter is employed as set forth in No. 503 (A.D. 1864); after the gelatinous tissue has received the actinic impression and previous to its development, the said tissue is mounted upon a surface of glass. The uncoated surface of the glass is placed towards the light. Warm water is used to dissolve the soluble portions of the gelatinous coating, and thus to develop the image. The plate bearing the gelatinous image is surrounded with a rim, hardened by means of a protosalt of iron or of sulphate of alumina, coated with silver whilst wet, and electrotyped in copper. The resulting electrotype is backed up and used for "photo-"mezzotint printing." The said printing is performed as follows:—Warm gelatinous ink is poured upon the greased surface of the electrotype and allowed to cool and solidify; an even pressure is applied to a piece of paper placed over the ink, a press with an elastic tympan being employed for that purpose.

The prints thus obtained are fixed by means of a solution of alum. When the image is produced by means of a camera the surface of the glass to be coated is previously covered with a thin film of caoutchouc or coagulated albumen.

To adapt this invention to copper-plate printing, the sensitive gelatine has an increased quantity of colouring matter, the rim is not used, and thin walls are formed in the recesses of the plate to prevent the removal of the ink in the act of wiping.

To adapt this invention to typographic and lithographic printing, a "crayon photograph" is produced. For this *purpose* charcoal, or other opaque substance, is mixed with the sensitized gelatine. When the image is mounted on glass (by means of a caoutchouc solution) the soluble portions of the gelatine are removed by means of warm water.

[Printed, 6*d*. No Drawings.]

A.D. 1865, July 29.—N° 1962.

ABEL, FREDERICK AUGUSTUS.—"Improvements in compounds "for waterproofing and insulating purposes."

1st. Waterproofing.—For this purpose, either ordinary or vulcanized India-rubber or gutta percha is made to combine with paraffin, beeswax, stearine, spermaceti, or other solid fatty substances or mixtures thereof, the said combination being effected by the aid of heat in conjunction with mechanical means. It is advisable not to heat the materials much above 260° Fahrenheit. The said mixture may be spread upon the fabric or other material, or the said material "may be soaked" in the compound "when in "a melted state."

2nd. "Improvements in the mode of preparing the before-"described compounds of india-rubber and gutta percha for in-"sulating and protecting electric telegraph and other wires, ropes, "or cables."—The India-rubber or gutta percha is placed "in a "bath of paraffin or beeswax, heated by preference to a tem-"perature of from 120° to 150° Fahrenheit when gutta percha is "employed, and from 220° to 250° Fahrenheit when india-rubber "is employed; and when, by the absorption of a certain quantity "of the paraffin or beeswax the india-rubber or gutta percha has "become soft and adhesive," the said India-rubber or gutta percha is removed from the bath. The wires may be coated by means of helically-wound bands of the above-mentioned compounds, the

wire being heated to about the melting point of paraffin or bees-wax.

The portion of the invention which relates to insulating telegraph wires is disclaimed in the Final Specification.

[Printed, 4d. No Drawings.]

A.D. 1865, July 31.—N° 1979.

NEWTON, Alfred Vincent (*a communication from Jerome Kidder*).—"An improved method of obtaining induced currents "of electricity from magnets and induction coils."

"This invention relates to the obtaining of induced currents "from the central or so-called neutral portion of a magnet, or "that part which has no attractive power, it having been proved "by experiment that here the strongest induced current may be "obtained." According to this invention, therefore, the helix by which the induced current is obtained is arranged, preferably, at the central part of the magnet, the primary coil extending equally throughout the length of the soft iron core of the instrument.

In one instance, the spool of the helix on which the secondary coil is wound is moveable lengthwise upon the primary coil of the arrangement. By this means the power of the secondary current may be varied, it being greatest when the spool is midway between the magnetic poles of the bundle of iron wire; it is noticeable that the helix of the secondary coil is flat in comparison to that of the primary coil.

In a second instance, the induction coil is longer in proportion to its diameter than in the above instance, and is fixed to the primary coil at the centre of its length; a cylindrical metallic cap sliding over "one end of the magnet and over the induction coil," regulates the power of the secondary current.

In obtaining "an induced current of great force from a per-"manent magnet," the induction coil is placed round the neutral portion of the revolving armature or of the permanent magnet. This part of the invention is not mentioned in the Final Specification.

[Printed, 6d. Drawing.]

A.D. 1865, August 3.—N° 2016.

PREECE, William Henry.—"Improvements in railway elec-"trical signal apparatus."

The Provisional Specification sets forth:—

"The object of this invention is to prevent the possibility of a "signalman signalling that the line is clear until the train which "should control his movements has actually passed his box; to "this end I apply to the switch of railway signal" [electric?] "telegraph apparatus a means of locking the switch handle" after it has been used to signal, and of retaining it until released by the action of a passing train. "The switch lever, as it is "moved, gives a rocking motion to a crank lever fitted with a "spring catch; this spring catch, in one direction of its motion "strikes a pin on a sliding bar, and drives that bar forward, but "on its return motion the spring catch slides over the pin. "Affixed to this sliding bar is a plate, which as the bar is slidden "forward enters a notch in the end of the switch lever and locks "that lever. Pendent from the switch box is an arm which is "vibrated by any convenient lever arrangement set in action by "the passing of a train or engine over a raised stop connected "with the lever arrangement. This vibrating arm when moved "strikes a second pin or projection on the sliding bar before men-"tioned and forces it back, together with the locking plate, which "leaves the switch lever free to be moved by the signalman."

The Final Specification sets forth more in detail the electric connections of the switch:—The switch handle is mounted upon an insulated centre, and can either be put into communication with the earth or with the battery, according to its position. The said switch handle works "the electric signal apparatus at a distant "station," and (by the above-described locking apparatus) prevents the said electric signal apparatus from being under the control of the signalman until the train has acted upon the "lever "arrangement" and set the switch apparatus free.

[Printed, 10*d*. Drawing.]

A.D. 1865, August 4.—N° 2025.

MULHOLLAND, Frederick George.—"Improvements in "the mode or method of preparing materials for and in the "manufacture of, submarine telegraphic cables, the same being "generally applicable for other purposes."

This invention relates to improvements upon processes described in No. 2386 (A.D. 1863).

1st. Two or more conducting wires, of chemically-pure copper, are loosely entertwined "in their entire length," and at each junction

they are lapped or extended "so as in case of the cable being "subjected to straining under any circumstances the wires in "each of the conductors may by extension in their length give "out by elongation in lieu of offering resistance thereto." The said wires are coated with the inventor's insulating compositions, then "with repeated layers of india-rubber immersed in composi-"tion as before."

2nd. The conductors are coated with the "compounds herein-"after described," served with hemp and covered externally with iron or other wires, "the completed construction" being passed through rollers, and the whole perfected by splashing it through a vessel containing the composition maintained in a state of liquefaction by heat.

3rd. "The preservative and protective composition" contains "asphalte," plumbago, caoutchouc, naptha or benzine, sulphur, "silicieous" [silicic?] acid, phosphoric acid, and bisulphide of carbon.

In the Final Specification, but not in the Provisional Specification, the following points are mentioned:—The "deoxidation of "the surface of the wire or wires;" and "the combination of any "number of insulated conductors to form a cable capable of "admitting the transmission" [of?] "all" [the?] "various "symbols at one and the same time, whereby increased powers of "communications are ensured."

[Printed, 4d. No Drawings.]

A.D. 1865, August 7.—N° 2047.

CROSSLEY, Louis John (*a communication from Louis Brequet*).—"Improvements in electric telegraphic apparatus."

"This invention consists in combining in one instrument the "three several parts of the alphabetical electric telelegraphic "apparatus known as the bell, the receiver, and the transmitter; "and in constructing and arranging those parts so that when "the instrument is closed any current entering from the line wire "will ring the bell, and when opened the bell will be thrown out "of circuit and the receiver placed in circuit, and also in a posi-"tion for the clerk to receive the message. The apparatus is in "two parts, hinged together in the form of a box or folding case; "the bell is fixed upon the top part covered by a lid, the receiver "is fixed within the same part, and the transmitter in the bottom "part. When the apparatus is closed the bell is in circuit, but "when open it is thrown out, and both the receiver and trans-

"mitter are placed in circuit. This is effected by means of a "stud fixed on the receiver, which, when the apparatus is closed, is "in contact with and depresses a spring fixed on the transmitter "communicating with the line wire. When the apparatus is "open the stud is removed out of contact with the spring, which "is then at liberty to rise and come into contact with another "stud which is in communication by a wire with the receiver. "Thus, when the apparatus is closed, the current is communi- "cated to the bell to call attention, and when opened it is trans- "ferred from the bell to the receiver. By this invention the "several parts of an ordinary telegraphic apparatus are combined "in one compact portable instrument or machine."

[Printed, 4d. No Drawings.]

A.D. 1865, August 11.—N° 2088.

GUY, Henry Robert.—"Improvements in the construction of "submarine telegraph cables."

"The object of my invention is to diminish the specific gravity "of submarine telegraph cables."

"The cable, after being first covered with any insulating sub- "stance now in use, and which is capable of resisting the action "of water, is coated with a combination of ground or granulated "cork and india-rubber, such as is used in making cork carpet "or kamptulicon." This compound is prepared as set forth in No. 1387 (A.D. 1861). "The coating of ground or granulated cork "and india-rubber must be of such a thickness as to diminish "the specific gravity of the cable to the required amount."

The gutta-percha-covered telegraph wires are covered with iron wire in the ordinary manner. A strip of the "cork carpet mixture" is passed through a solution of India-rubber, and then through a drying box to evaporate the solvent, leaving the coating of India-rubber in a sticky state. The said strip is then wound round the cable, "taking care that the edges of the strip are brought close "together." The whole is then to be covered with India-rubber or gutta percha. "Instead of india-rubber the ground or granu- "lated cork may be mixed with gutta percha, previously dissolved "in or softened by coal tar, naptha, or other known solvent, or "with linseed oil thickened sufficiently by long boiling with "oxide of lead, white copperas, or any other substance used for "that purpose."

[Printed, 4d. No Drawings.]

A.D. 1865, August 15.—N° 2110.

HENRY, MIÇHAEL (*a communication from Henry Avet.*)—(*Provisional Protection only*). "Improvements in the production of "surfaces by means of photography."

This invention relates to the production of printing and other surfaces. On the collodionized side of a glass negative is spread a film of gelatine combined with bichromate of potash, sometimes first forming a border of wax. The plate is then placed horizontal to allow the film to dry, and is exposed to the action of light on the non-collodionized side. "Next, by means of the camera "obscura, the portions of the film which the black and half tints "have preserved from the action of light are dissolved (when "gelatine or gum is used this can be done by hot water). When "dry the subject will appear in relief." "Any antiphotogenic "shade resulting from the bichromate is removed. The subject "being metallized by the nitrate of silver" is then electrotyped, or a gutta percha impression thereof is electrotyped. "Sometimes "instead of applying the film in solution it may be applied in "leaf or scales." Leaf gelatine may be sensitized by immersion in a solution of bichromate of potash. "To produce an artificial "grain a drawing is made in fine white lines on a colored "antiphotogenic background, or vice versâ." "A photographic "negative is made by first photographing the grain and then the "object, or vice versâ." "The negative is then treated according "to the above-described method. A design of the grain may be "obtained by making a negative from a reduced drawing in black "lines on white ground; it may be used as (a transparent) or "applied on another negative with the collodionized surfaces in "contact."

[Printed, 4*d*. No Drawings.]

A.D. 1865, August 18.—N° 2134.

CLARK, JOSIAH LATIMER.—"Improvements in apparatus for "raising and recovering submerged telegraph cables."

1st. "An apparatus for regulating and easing the strain on "submarine cables while they are being raised to the surface."— "Between the bows of the vessel and the hauling-in machinery I "place an apparatus consisting of an air or vacuum cylinder and "piston, placed (by preference) vertically. On the top of the "piston is fixed a pulley or set of pulleys revolving loosely on a

" common axis, and immediately above is a similar set of fixed " pulleys. The cable lifting rope after entering at the bow of the " vessel passes over the upper pulley, then round the lower pulley " which is attached to the top of the piston, then over another of " the upper pulleys, and thence to the hauling-in machinery; a " certain regulated degree of vacuum or pressure is maintained in " the cylinder, which draws or forces the piston down, but allows " it to yield if the strain on the cable or lifting gear exceeds the " regulated amount."

2nd. " A grapnel for raising submerged cables."—" I so make " the grapnel that it grips the cable securely, and immediately " after severs it in two, so that one end falls back to the bottom, " and the other end is retained and raised to the surface." The grapnel resembles an anchor; " at the lower or inner end of the " grapnel arm" is the clamping apparatus; " it consists of two " cheeks," with " vice-like teeth upon them," which are connected together by screws. Spur wheels gear all these screws together, " so that they all act simultaneously in closing the jaws." The screws are also geared with a roller round which a chain is wound; the end of the chain is connected to the main grapnel rope.

Two vessels are employed, that nearest the end of the cable using a cutting grapnel, and the other or cable vessel using a grapnel without cutters and the above-described regulating apparatus.

[Printed, 2s. Drawings.]

A.D. 1865, August 19.—N° 2144.

WATSON, John Samuel, HORWOOD, Albert, and BRUMFIT, Charles.—(*Provisional Protection only.*) " Improvements " in constructing constant galvanic batteries for giving a signal " or alarm in case of fire and any other telegraphic purposes."

In constant batteries, a bottle, with its neck turned upside down in the battery cell and filled with the exciting fluid, called a " supply bottle," always keeps the fluid in the battery cell filled up to one desired height, the liquid in the battery cell being always level with the mouth of the " supply bottle."

The amalgam of zinc, used in the battery arrangement, which is preferred, is made by fusion. The amalgam is then cast " in " the shape of a flat plate, with the bottom edge or edges turned

"up, so as to form one or two chambers for the purpose of hold-"ing a quantity of mercury."

"For the purpose of detecting the presence of fire in any build-"ing or ship, we place an air thermometer in each apartment "constructed with three chambers, viz., 1stly, the expanding "chamber; 2ndly, the reservoir for holding the mercury; and "3rdly, the receiving chamber for the mercury, two of the cham-"bers being arranged in a vertical position, and the glass tube "gradually on the incline with the receiving chamber at the top; "we then place two insulated wires into the top or receiving "chamber in circuit with an electric alarm bell and battery."

[Printed, 4d. No Drawings.]

A.D. 1865, August 21.—N° 2155.

JENKIN, FLEEMING.—(*Provisional Protection only.*) "Im-"provements in machinery to be used in the manufacture of "telegraph cables."

"The cables as manufactured, and before or while being finally "coiled away on board ship," are subjected to a proof strain. By this means "any injury likely to occur in paying out the cable "may be forestalled and remedied," the said cable being "ex-"amined for mechanical and electrical defects" subsequently to the test. "I place in front of the drawing-off drum of the "machine, by which the cable is covered with the strengthening "material, a second drawing-off drum driven by powerful fric-"tional gearing, so as to go slightly faster than the first drawing-"off drum if not checked. Between the two drums I allow the "cable to fall in a bight, passing under a loose pulley loaded "with the weight calculated to produce the proof strain required "on the cable." "The speed of the second drawing-off drum" is regulated "by a strap on a double cone." "Instead of the "weight and loose pulley the required strain may be brought on "the cable by putting two drums in front of the drawing-off "drum. The new drum next the machine is not driven by the "machine, but is retarded by a break," "so as to cause a sen-"sible constant retarding strain to come upon the cable before the "foremost drawing drum" "can pull the second one round; the "loose loaded pulley may be used in conjunction with these two "drums, or omitted. Or I place a similar arrangement of two

" drums, one driven by machinery and the other retarded by a " break between the ship tanks and the shore tanks. The cable " may either pass under a loaded pulley giving the desired strain, " or the break alone may be trusted to." " When the drums are " placed in this second position, the speed of the drawing drum " is regulated by convenience only."

[Printed, 4d. No Drawings.]

A.D. 1865, August 22.—N° 2161.

MARSDEN, CHARLES.—(*Provisional Protection only.*) "Im-" provements in the construction of electric telegraph cables and " in the preparation of telegraph wires."

"The object of the first part of my invention is to permit of " great battery power being employed without causing the copper " wires to be united by fusion.

" My invention consists in placing round each wire, after having " received one coating of gutta percha or other like insulating " material, a pipe formed by preference in two halves longi-" tudinally of glazed terra cotta, porcelain, or other like glazed " ware, glass, or vitreous composition; such pipes are placed at " intervals of say two inches more or less, and I prefer each pipe " to be about an inch long, and then I add a coating of gutta " percha or other like insulating material. As many wires coated " and protected as aforesaid as may be required are used to form " a cable.

" My invention further consists in embedding any number of " wires protected as aforesaid or otherwise in gutta percha or " india-rubber to form a core, and in encasing this core in a " metal tubing, formed as hereafter described, I make metal " tubing in two halves longitudinally and make the ends step-" wise, reversed on each end, at one end I make two apertures to " receive two nuts or studs rising from the next length, and I " form a groove for the reception of wire, whereby to tie one " length of pipe to the next and so on. I thus form a strong " and flexible joint. For convenience of coiling I prefer the " length of the pipes not to exceed six inches. My cable may be " used without further outer covering or the tubing may be " covered by hemp or other rope."

[Printed, 4d. No Drawings.]

A.D. 1865, August 28.—N° 2209.

JONES, Stopford Thomas.—"Improvements in submarine "electric telegraph cables."

"The object of my invention is to give to the cable any degree "of buoyancy that may be found desirable, by enveloping the "insulator with cork; I prefer leaf or sheet cork for this purpose, "to be made adhesive with cement if required; the quantity of "cork is easily ascertainable by or according to the specific "gravity of the cable to be used. From the buoyancy of this "cable it will descend in the water so gradually there will be "scarcely any strain in paying it out, and when laid at the bottom "there will be little or no friction, consequently it will be "durable."

[Printed, 4d. No Drawings.]

A.D. 1865, August 28.—N° 2213.

PIGGOTT, William Peter.—"Improvements in electric tele- "graph cables, and in transmitting signals therethrough."

This invention relates to improvements upon No. 2957 (A.D. 1860), "and has for its object the simplification of the construc- "tion of cables intended to be worked by induced electricity, also "the facilitating the means whereby two or more messages "or signals may by the aid of induced electricity be transmitted in "the same or in opposite directions simultaneously or otherwise "along the same cable."

In "one form" of cable, the several wires are "partially insu- "lated from each other," and the number of wires is determined by the number of messages to be sent and received through the cable at the same time; "one or more of these wires must be of "opposite electrical denomination to the rest." The invention is further described with reference to cables that admit of only one message being sent at a time.

In one mode of carrying out the invention, the cable consists of two wires, one copper the other iron; zinc earth plates are always in connection with the terminals of the iron wire; to the extremities of the copper wire the sending and receiving apparatus are respectively connected; copper earth plates, from the free terminals of the said apparatus, complete the arrangement. No separate galvanic battery is employed, but when the key of the sending instrument connects the copper conductor with the copper earth plate at the sending station, "a disturbance of the induced elec-

" tricity in the cable instantly takes place," and the galvanometer at the distant end of the cable is put in motion.

In a second mode of carrying out the invention, each wire " forms a plate of a pair of elements in the cable itself, and which " may be brought into combination with other pairs or elements " at either end," " so that each wire of the cable makes one of a " pair which may be united in the same manner as the ordinary " cells of a battery in a series." The negative wire of the cable is connected with the zinc plate of a battery at the receiving station; its other end is free. The positive wire is connected with the negative plate of a battery at the sending station, its other end being free. The remaining battery poles are connected respectively with the sending and receiving instruments. The remaining terminals of the said instruments are connected to earth plates, the sending instrument to a zinc, and the receiving instrument to a copper, earth plate.

In a third arrangement, the terminals of the negative wire are respectively connected with the sending and receiving instruments. The free end of the sending instrument is connected to the zinc plate of a battery, and that of the receiving instrument to the negative plate of a battery; the remaining plate of the former battery is connected to the positive wire of the cable, and that of the latter battery to a copper earth plate.

In a fourth arrangement, a copper single-wire cable is connected, at its terminals, to the sending and receiving instruments respectively, and a battery is interposed between the free ends of the said instruments and their earth plates; a zinc earth plate is in connection with the negative plate of the battery at the sending station, and a copper earth plate is in connection with the positive plate of the battery at the receiving station.

To work, according to this invention, with an ordinary cable, its iron covering is connected to the earth, and the copper core to the receiving instrument.

The "low tension" battery used in this invention consists of graphite, chloride of calcium, and zinc.

[Printed, 8*d*. Drawing.]

A.D. 1865, August 29.—N° 2217.

LAMING, Richard.—" Improvements in electrical telegraphy."

1st. " The suppression either wholly or in part of retarding " charges on the signalling conductors of electrical telegraphs by

" means of a second conductor placed for that purpose around " each of them and made to act inductively upon it by possession " of a permanent electrical charge of the same character as that " in use for supplying the signals."

The insulated central conductor of the cable is enveloped by a metallic cylinder or tube, also insulated from the exterior covering. " One or each of the ends " of the tubular conductor is placed " permanently in communication with the particular pole of a " voltaic battery which corresponds to that connected with the " inner conductor." " I recommend three batteries to be used, " a separate one on the central conductor and two of equal inten- " sity on the outer conductor."

2nd. " The use of moveable weights round subaqueous cables," to assist in raising the same. " To facilitate the raising of marine " cables for repairs," they are made " of light specific gravity," and are sunk " by the use of moveable jointed metallic rings or " weights, sliding down upon them while in the act of sub- " mergence; the weights being capable of passing off from or " towards one or more ends of a cable on an end or a bight being " subsequently lifted." Each weight is composed of two halves (or semi-cylinders) which, when hinged or pinned together, forms a short pipe with two trumpet mouths; the said weights " fit " very loosely on the cable."

[Printed, 4d. No Drawings.]

A.D. 1865, August 31.—N° 2238.

COWPE, Edward, and HANCOCK, David.—" A new or " improved method of and apparatus for applying electro-magne- " tism as a break power on railways."

This invention " consists of an improvement on and an addition " to " No. 101 (A.D. 1865).

" In the Specification of the aforesaid Patent we stated that " the magnets should be applied to the wheels themselves or to " plates attached thereto; now, according to this our present " invention, we fit the magnets in a frame," " capable of receiving " a to-and-fro motion within certain limits, but instead of fixing " the said frames as therein described in a horizontal position, we " now place them in a vertical position, and in such manner that " the magnets are suspended above the line of rails or permanent " way on which the train runs. Power is applied from the break

"van or tender as before, but the magnets, instead of acting "upon the wheels, in this case drop and act against the rails." This invention may either be used alone or in conjunction with the former apparatus.

The Drawings show a battery in the "break van," the two poles of which are united by means of a dial, "so that according "to the direction in which the handles are moved so the power "is applied or withdrawn." "In order to effect a communication "from the break or guard's van to other carriages," "we fit to "the ends of each carriage two spring buffers of unequal length." These buffers carry at their ends metal buttons, secured to rods, "which are united to the wires in connection with the magnets "and battery in the break or guard's van."

[Printed, 10*d*. Drawing.]

A.D. 1865, September 1.—N° 2257.

CLARK, William (*a communication from Amédée Mathurin Gabriel Sébillot*).—"Improvements in laying and maintaining "submarine telegraph cables, and in apparatus connected there-"with."

1st. "A method of dividing the cable into short lengths rela-"tively to the distance between the extreme points."

2nd. "A method of suspending the cable in the water at just a "sufficient depth below the surface to be free of ships passing "over it."

The cable is "connected to a certain number of submarine "stations forming so many relays." In one case, the submarine station consists of offices, ventilation arrangements, receptacle for coats, &c., and is of itself buoyant; it is held in position by a cable which descends to the bottom of the sea, "where it is held "stationary" by a weight. In another arrangement, the station is made to float on the surface of the water, a fixed vertical guide being provided, on which the said station may rise and fall by the action of the waves. "The vertical guide is formed of a suitable "body possessing sufficient ascensional force submerged at a "certain depth, and retained in position by means of a weight."

The cable consists of a copper conducting wire in an insulating covering of gutta percha, "with a simple casing of hemp;" it is "suspended at a suitable depth by means of floats placed at "distances apart. These floats are formed of hollow tinned iron

"cylinders, connected by a conical part with the suspending "rope." At long intervals, weighted lines or cables are attached to the telegraphic cable.

To render the laying absolutely sure the cable is provided with cork cushions.

In great depths, the cable is secured by a series of vertical mooring cables and buoys, which are connected by horizontal ropes, the said ropes forming "a bed on which to rest the cable."

[Printed, 1s. 8d. Drawings.]

A.D. 1865, September 2.—N° 2261.

SPROUL, Joseph.—(*Provisional Protection only.*) "An im-"proved method of laying or submerging ocean telegraph "cables."

In the cable used to carry out this invention great strength is not required. The paying-out ship is provided with a sufficient number of buoys, and, when the nearest deep-sea soundings are reached from the point of departure, the said ship stops, the cable already paid out is tested, and a buoy affixed thereto and thrown overboard; this operation is repeated at a distance of a small number of miles, and at every such similar distance until the destination is reached. In the event of a fault being discovered at any one of these operations, the portion of the cable laying near the surface, between the ship and the last buoy, could be at once recovered. If the cable broke, or had to be cut, a splice could be made at the last buoy. A "picking-up ship" follows the paying-out ship, and picks up the buoys, "so that two would always "remain untouched betwixt the two vessels."

"In stormy weather the cable would always have to be cut, so "that the ship could hold it in its proper position during the "storm, either by laying hold of the last buoy," or "by a "grapnel."

"The buoys in all cases would be fastened to the cable with "tackling that would allow it to sink deep enough to reach still "waters," "but not so far as to render its recovery difficult in "case of a fault being detected, or when snapped or cut."

[Printed, 4d. No Drawings.]

A.D. 1865, September 2.—N° 2262.

PERCEVAL, Kirwan Joyce.—(*Provisional Protection only.*) "Improved means or apparatus to be used in laying telegraph "cables in the sea or other deep waters."

The steamer carrying the cable is to be provided with "a suffi- " cient number of strong buoys" that present "a surface to the " water that will resist the downward strain of about one ton " each." "The buoys or floats should be loosely covered with a " network of iron chains and rope, in order to distribute the " pressure equally over their surface, and the links of the same " should be able to bear a strain of about 24 hundredweight." " Vices, devil's claws, or drawing tongs" are also required. "For " every mile of cable that is paid out one of these floats or buoys " is to be fastened to it on board by means of the vices, devil's " claws, or drawing tongs, and then lowered into the sea. When " those on board think fit to make a signal to the steam tender " astern to raise up the hinder floats the order might be obeyed, " and the floats released from the cable could be forwarded to the " front by a second steam tender. As the hinder floats, especially " in deep water, would have at least a strain of 16 or 17 hundred- " weight upon them there should be on board the tender a " large hauling hook worked by steam, which would relieve the " strain astern of the float from either the claw, vice, or drawing " tongs, and enable those on board the tender to release the same, " and forward the floats to the front."

By this invention cables may be prevented from sinking below the surface, or they may be suspended below the reach of ships' bottoms. Astern of the paying-out vessel, four or five miles of the cable may be kept afloat.

In this Specification allusion is made to the Atlantic cable.

[Printed, 4d. No Drawings.]

A.D. 1865, September 11.—N° 2326.

INKPEN, Samuel.—(*Provisional Protection only.*) "Improve- " ments in covering submarine telegraph cables, and in the " machinery and means employed for paying out or hauling in " the same."

"The insulated wires constituting a telegraph cable" are "laid " between one or more flat longitudinal continuous layers of " stout canvass or webbings, which are cemented with india- " rubber or other suitable cement, and firmly stitched or secured " together so as to form flat longitudinal projecting webs or " flanches on each side of a cable so covered."

According to that portion of the invention that relates to the paying out or hauling in of the cable, the cable is conducted

from a reel in the hold of the vessel "between a pair of grooved "rollers capable of nipping the side webs only by means of a "lever or levers which act to press the rollers together. The "central part or core of the cable passing freely between the "grooves of the rollers, from which it is conducted between guide "rollers to the delivering pullies or rollers mounted in suitable "bearings at the stern of the vessel." The delivering rollers have undulating surfaces, so as to hold the side webs of the cable firmly, and their axes carry toothed wheels, to which motion can be given by a steam engine which is "capable of being thrown in "and out of gear as required." When the cable is being paid out, it runs freely between the delivery rollers; but, when required, its outward movement may be stopped by the lever brake apparatus, and it can be hauled in by means of the toothed gearing.

Although two webs are preferred, one web only may be formed upon the cable.

[Printed, 4d. No Drawings.]

A.D. 1865, September 12.—N° 2332.

MACINTOSH, John. — "Improvements in constructing and "insulating telegraphic conductors, and in apparatus connected "therewith."

1st. "Taking a number of small wires of copper, alone or in "combination with other good metallic conductors of electricity, "and passing these through revolving dies or grooved rollers, "which press them into a cylindrical form," "which form offers "the least surface for induction." The wires thus formed are then firmly bound round with films or ribbons of insulating material "by any suitable covering machine," or a coating of collodion, as described in No. 1090 (A.D. 1858), may be applied externally. The wires are joined at different places to form the cylindrical conductor, which may be of any length "without "stopping, stranding, or soldering, as heretofore."

2nd. The conductor is still further insulated with numerous thin fillets of India-rubber, gutta percha, or of the compounds of paraffin, as described in No. 1560 (A.D. 1860), the said fillets being fully stretched and placed longitudinally on the conductor. An outside protective coating of semi-vulcanized India-rubber in a hot plastic homogeneous state may be employed, or the compound of India-rubber and carbon set forth in No. 2269 (A.D. 1859) may be used.

3rd. An apparatus for covering conductors with numerous thin coatings at one operation. Two rollers, with several graduated grooves, receive the insulating material. By an arrangement of pulleys, the wire is passed through the hopper and through the grooves in succession, the final coating being received from the largest groove. This machine is compared with that set forth in No. 1924 (A.D. 1858).

[Printed, 4d. No Drawings.]

A.D. 1865, September 13.—N° 2341.

PHILLIPS, JOHN OLIVER CHAPMAN.—(*Provisional Protection only.*) "Improvements in the construction of submarine "telegraph cables."

"The object of my invention" is "so to construct the said "cables as to give them a certain buoyancy, and thereby prevent "them sinking to the same extent as ordinary cables, and to "facilitate the raising of the cable for repair."

A cable is surrounded or united with "tubes or chambers con- "taining air or other gaseous mixture. The air tubes or cham- "bers may either be fixed around the outside of the cable and "parallel thereto, or they may be passed around the outside of "the cable in a helical or corkscrew like direction, or the said air "tubes or chambers may be imbedded in the insulating or pro- "tecting material of the cable. When the air tubes or chambers "are used outside the cable they may be fixed thereto by bands "or ribbons, or in any other convenient way. I prefer to divide "the air tubes or chambers into compartments, so that injury to "one part of the tube or chamber shall only affect that compart- "ment in which the injured part is situated. By constructing "submarine cables in the manner described, a certain amount of "buoyancy is given to the cable so as to cause it to float or sink "to such a slight depth as will considerably reduce the strain "during the paying out of the cable or during the raising of the "cable for repair."

[Printed, 4d. No Drawings.]

A.D. 1865, September 14.—N° 2356.

CLARK, WILLIAM (*a communication from Robert Kirk Boyle and Guiseppe Tagliabue*).—"Improvements in magnetic tele- "graphs."

The system comprised in this invention consists of a punching instrument, a transmitting instrument, and a receiving instrument. The perforating instrument perforates a strip of paper, in which the lateral position of a perforation determines the letter to which the said perforation corresponds, and the words follow on in the longitudinal direction of the paper. On being suitably placed in the transmitting instrument, the paper strip (by means of its apertures) determines the intervals between those currents sent to the receiving instrument that are really active in printing the letters. The receiving instrument prints the letters of the message in type, upon a paper strip suitably prepared, and made to pass through the instrument at the same rate as that of the transmitting instrument.

In the perforator, the paper is "stretched" on a cylinder, which is capable of rotary motion—governed by a letter disc; and of longitudinal motion—by means of a stationary screw, on which it is caused to travel by the rotation of the letter disc. Care being taken to make a mark at the zero point, the places on the paper at which a punch (that is operated by a handle at right angles to the paper) is to make perforations, are determined by the position of the letter disc in reference to a fixed stop.

In the transmitter, the paper, mounted upon a cylinder similar in size and in attachments to that of the perforator, is moved by clockwork. Whenever a perforation comes under the point of a spring, an electro-magnetic arrangement (comprising an oscillating pawl attached to the armature of an electro-magnet, and a cog wheel in connection with the clock movement) stops the rotation of the paper cylinder for a sufficient time for the letter that is then presented to the paper at the receiving station to be printed. A "division wheel" and springs—equivalent to a commutator—continually send alternate currents to the receiving instrument to control its motions, excepting during the stoppage to print a letter.

The receiving instrument "consists principally of a set of four "intensity coils"—in the line-wire circuit—"and a vibrating "horse-shoe magnet, which controls the motion of a clock move-"ment, and through it that of the type wheel;" "from the horse-"shoe magnet extends a horizontal arm, the forked end of which "straddles an escapement wheel." The said horse-shoe magnet also serves as the needle of a relay, and, when it remains a suffi-

cient time in contact with a stop (during the passage of a perforation under the spring of the transmitter), it calls into action the "printing" electro-magnet, by establishing a local circuit.

When this is the case, an armature fork releases an escape wheel, and the printing mechanism is worked, a "dog," arm, spring, and printing block being used for that purpose; the motion of the type wheel is arrested by the stoppage of the "horse-shoe" magnet. "The types are made of a series of sharp points so that "they readily perforate the paper."

To prevent the message from being read by the receiving clerk, the paper strip, either before or immediately after printing, is covered mechanically with paper or textile fabric.

Many other details are set forth.

[Printed, 1*s*. 4*d*. Drawing.]

A.D. 1865, September 22.—N° 2416.

BOGGETT, William.—(*Provisional Protection only.*) "Improvements in manufacturing wire conductors for electro-telegraphic purposes."

It being taken for granted that "the currents of electricity "usually employed in electro-telegraphy" do not penetrate the substance of the wire, but pass along it in contact with the surface only, the inventor uses an iron or steel wire, covered with copper, instead of a conductor wholly composed of copper. The iron or steel gives increased tensile strength, and, "in cases where "either of those metals are suspended in the air," the copper protects them from oxidation.

"I pass copper wire between rollers in order to flatten it the "requisite size and thickness; it is then annealed and one end "enfolded longitudinally over the wire to be covered; in this "state they are inserted in a hole of proper dimensions in a "drawplate, when the copper wire by the act of drawing through "will encase the iron core in a uniformly smooth and closely "adhering cover.

"According to my view the power of conduction depends "wholly on the amount of surface. It may in some cases be "desirable to increase the surface of the wire by fluting it after "the manner of pinion wire, and if desired it can be ammalgamated "with quicksilver."

[Printed, 4*d*. No Drawings.]

A.D. 1865, September 22.—N° 2421.

MOSELEY, WALKER.—(*Complete Specification, but no Letters Patent.*) "An improved indicator for electric bells and a new "battery manipulator combined for ringing electric bells and "other signals."

This invention "relates to means for indicating to the eye by "the presentation of a plate bearing a number," "simultaneously "with the sounding of an electric bell;" "and also to improved "construction and arrangement of a galvanic battery and mani-"pulator used in connection therewith for producing the required "motions."

Certain drawbacks in the usual arrangements are avoided "by "making use of a battery that will serve as the manipulator "also." This is attained "by withholding the poles of the "battery above the surface of the exciting liquid by means of "a spring, so that by pressing down the poles into the liquid the "current is produced, and the bell or signal, or both, is or are at "once put in action, and on withdrawing the pressure the poles "are raised by the spring."

The indicator consists of "the French trembling bell" with attachments which, on the ringing of the bell, release the aforesaid number plate from behind the bell; a spring lever, with depending cord, is used to elevate the number plate by hand and to replace it behind the bell, when the attendant is about to attend to the summons.

The battery preferred is a carbon-zinc arrangement charged with a solution of "persulphate of mercury;" the zinc plate enters a porous cell, and the carbon is in the exterior vessel.

The number plate of the indicator has a projection which rests upon the hammer, in the normal state of the instrument; the centre of gravity of the said number plate is so placed that it bears very lightly upon the hammer. When the hammer strikes the bell, the number plate revolves on its axis and shows the number.

[Printed, 10*d*. Drawings.]

A.D. 1865, September 30.—N° 2509.

MEE, JAMES AUSTIN.—"Certain improvements in telegraphic "cables."

In the submarine or other telegraphic cable which is the subject of this invention, the insulated conductors are surrounded by a

" cylindrical sheald " or " metalic tube," composed of a number of " anguler or prismatically-formed " wires. " This metalic " sheald is constructed so as to embrace the insulation material " in a spiral " [helical ?] " form, after which it is surrounded or " covered with hemp, flax, or other suitable material, this fibrous " coating is again covered finally with spiral metalic wires of the " ordinary form, the spiral course of which runs in a direction " opposite to the afore-mentioned intermediate internal wires, " forming a cylindrical tube or sheald for the conducting medium."

The Drawings show sectional and other views of the *cable*, constructed as described above, these views being " full size." Enlarged diagrams are given of the " intermediate internal wires," from which it appears that in cross section the said wires are four sided. The two sides which abut together in the cable, " form an " angle corresponding with a line drawn radially from the centre of " the cable, the whole series or number when combined," " forming " a tube that becomes stronger by compression or strain." The remaining sides of the said wires are curved to the circumference of the circle of which, when combined, they form a part.

[Printed, 6*d*. Drawing.]

A.D. 1865, October 2.—N° 2521.

ALLAN, THOMAS.—(*Provisional Protection refused.*) " Improve-" ments in the preparation of iron, steel, and alloyed metals for " electro-plating."

" My invention consists in preparing the surfaces of the metal " to be plated so as to receive and take on the silver or other " metal without the intervention of a third metal to produce a " base or surface suitable for plating. After 'pickling,' that is, " exposing the articles to an acid solution for cleaning their sur-" faces, as is well known, I place them in an alkaline or in an " acid bath, and subject them to galvanic or electric currents. " On being removed from the bath they will be in a fit state to " receive the plating by the well-known process for the electro-" deposition of metals."

[Printed, 4*d*. No Drawings.]

A.D. 1865, October 3.—N° 2530.

BONNEVILLE, HENRI ADRIEN (*a communication from Claude Ernest Lami de Nozan*).—(*Provisional Protection only.*) " Improvements in the construction of submarine telegraph cables."

"This invention relates to an improved construction of sub-
" marine telegraph cables with a view to their better preservation
" and protection from injury. It consists, firstly, in covering or
" surrounding the conducting wire or wires with a tube or enve-
" lope of tin or other suitable and analogous metal before placing
" the hemp, tow, or other outside covering and the iron or steel
" shielding which protects the whole; and, secondly, in inter-
" posing between the gutta percha which surrounds the conducting
" wire or wires and the metal tube, a twisted or plaited layer of
" asbestos intended for protecting the insulating matter in case of
" it being necessary to solder the metal tube or envelope."

[Printed, 4d. No Drawings.]

A.D. 1865, October 6.—N° 2570.

GARDINER, Frederick William.—(*Provisional Protection only.*) "Improvements in apparatus for laying telegraphic cables " in deep waters."

"Following the ship containing the cable at a distance of two
" miles," "a powerful steamer having a paying out and winding
" up apparatus is employed, and from this apparatus there is let
" down a strong wire rope with a loop or stirrup at the bottom
" (called a sustainer) through which the telegraphic cable passes
" and takes a bearing." On the sustainer there is threaded a heavy metal weight, or "catch weight;" "it is somewhat in the
" shape of a bell with the clapper out, with a hole through the
" top of it," and is fastened by a rope that can be instantly cut. If the cable breaks near to where it is being paid out, the ship containing the cable signals to the steamer, the rope which holds the catch weight is cut, and the engines reversed. The catch weight descends, brings together the sides of the loop of the sustainer, and tightens the cable therein, so as to prevent the broken end from passing through. The sustainer is then wound on board, the cable is spliced, and all things are reinstated. One or more sustainers may be attached to buoys, so that the cable may be examined or kept under control, within easy raising distance, during the process of submersion.

At night, or in foggy weather, the vessel with the cable on board may have "an electric or other powerful light burning so as
" to enable the steamer" "to follow at as long a distance as
" is possible or requisite in the wake of the first vessel."

[Printed, 4d. No Drawings.]

A.D. 1865, October 7.—N° 2584.

MELLOR, Charles Hanson.—(*Provisional Protection only.*) " Certain improvements in telegraphic communication for the " purpose of indicating danger."

" The invention is designed to enable the guard or other com- " petent person in care of a railway train to make use of the " ordinary telegraphic wires for the purpose of conveying mes- " sages to and from the nearest station in the event of an accident " occurring between stations or on a portion of the line where " there is no signalling apparatus, so as to stop trains following " and to obtain assistance.

" The invention is also applicable to give alarm at fire-engine " stations or police offices where assistance is required.

" The invention consists in the adaptation of an electrical or " galvanic battery and signalling apparatus in the guard's van or " other part of the train having an earth wire, which is to be " placed in contact with the earth, and a second wire, to the " extremity of which a screw or spring clip is attached; when " an accident occurs the clip is to be secured to the telegraph " wire passing to the nearest station, by which means the contact " and electrical circuit is completed, and messages may be sent " from the train to the station, and vice versâ.

" The invention consists, secondly, in the application to shops, " warehouses, and other buildings of a battery and signalling " apparatus, and of a moveable or portable wire carrying its own " means of attachment and contact, which may be attached to " any general service wire in case of danger, either to give alarm " at head stations through which such wire passes of fire, or for " police assistance, from shops, houses, warehouses, or other " buildings."

[Printed, 4*d*. No Drawings.]

A.D. 1865, October 7.—N° 2592.

THOMPSON, Jacob Baynes.—" Improvements in coating " iron and steel with gold, silver, platinum, or copper."

These improvements involve the electro-deposition of iron.

This invention " consists in first depositing iron from a solu- " tion on to the surfaces of articles composed of iron or steel, " and thus obtaining thereon a coating of pure iron, and then " further coating the surfaces of the articles with gold or silver,

"platinum, or copper, by deposition from a solution of one or "other of these metals."

The solution which is preferred for the electro-deposition of iron upon the pickled article, contains ferro-cyanide of potassium and potash, and during deposition is kept at a temperature of from 100 to 120 degrees Fahrenheit. "The intensity of the "battery should be such that when at work a few bubbles of "gas only are given off." Having been electro-coated with iron, the article is washed with a solution of ferro-cyanide of potassium, and is at once transferred to the bath for the deposition of the exterior metal.

"For silver and gold the ordinary cyanide baths may be em-"ployed," "and for platinum an alkaline sodio-chloride solution" is used.

"For the deposition of copper on the iron-coated article I use "the ordinary cyanide solution, or a solution of hydrated oxide "of copper in hyposulphate of soda." The solution is worked at a temperature of about 60° Fahrenheit. To hasten the deposit, the article may be transferred to a sulphate of copper bath after it has received a thin deposit as above.

Plated or gilt articles that are subjected to much friction are heated to a heat that will char wood; "this as it were burns the "silver or gold into the steel or iron."

[Printed, 4*d*. No Drawings.]

A.D. 1865, October 10.—N° 2605.

HUBERT, FRANÇOIS THIERRY.—(*Provisional Protection only.*) "Improvements in submarine electric telegraph cables, and in "apparatuses connected therewith."

1st. The said cables are strengthened by imbedding two or more insulated conductors in one covering.

2nd. Regulating the specific gravity of the said cables according to the thickness of the covering and the diameter or number of the perforated chambers. The following apparatus are used :—1. "A pressing roller," the surface of which is "shaped to give the "form required for moulding the gutta percha. The thickness "and width of the gutta percha is regulated by cutting knives "applied at each end of the roller; the knives being changed to "suit the thickness required for imbedding two or any number "of conductors." 2. A punching press, which perforates the gutta

percha after it has been rolled to a proper thickness, "the per-"foration to be applied as well as to the size as to the number of "chambers required." The weight of the said covering may be modified by the admixture of certain proportions "of feathers, or "pith of elder tree, or rush, or bark of oak, or ground bark, or "granulated cork, mixed altogether or separately after a pre-"servative immersion in a strong lime water, and dried well and "cemented with a solution of caoutchoux."

3rd. The external protective covering.—This covering is of gutta percha boiled twice in water; the thickness of the said covering is regulated by the herein-before mentioned pressing roller. This covering is powdered with a preparation which contains phosphorus, "prussiate or azotate of potassium, or deutoxide of lead," and starch; this preparation is "powdered externally on the "covering of gutta percha when warm."

[Printed, 4d. No Drawings.]

A.D. 1865, October 10.—N° 2612.

WILES, JOHN FLETCHER.—(*Provisional Protection only.*) "Improvements in submarine telegraphy."

The object of this invention "is to remedy the evils arising "from imperfect or defective insulation and fracture."

"Instead of sinking one of the poles of each battery in earth, I "insulate the battery and both its poles, and I also insulate the "sending and receiving instruments, and I provide in addition "to the signal or ordinary cable another wire or cable (or other "wires) duly insulated and made of a conducting material;" it is connected to the first wire or cable, "so that it acts as a return "conductor instead of earth or water." "I connect one extremity "of the second wire or cable to a pole of the battery at one end "of the line, and the other extremity of the wire or cable to the "receiving instrument at the other end of the line. And I connect "one extremity of the first-named cable to the opposite pole of "the battery, and the other extremity to the opposite end of the "receiving instrument, or vice versâ, so that the current may "flow through the first wire and back through the second or "inversely. In the event of fracture or of a defective insulation "of either cable or both cables, the current will pass over or "through the defective or fractured portion of one wire or cable "and after passing through the water pursues its course along

" the cable to the receiving instrument and returns along the " other wire or cable."

[Printed, 4*d*. No Drawings.]

A.D. 1865, October 16.—N° 2670.

KAULBACH, Reinhold Edward.—(*Provisional Protection only*.) "The improvement of the means of and apparatus for " laying submarine electrical telegraphic wires, lines, cables, or " other contrivances of a like sort."

This invention consists in "the formation of a permanent way " or bridge beneath the surface of the ocean for the support and " carrying through of the said wires," "the said permanent way " or bridge to consist of a series of vessels or condensers stationed " along the whole of the intended line of communication," at suitable distances, "sunk to an average depth of seventeen " fathoms, and firmly moored to the bed of the sea." The said condensers are air-tight and able to resist a pressure of ten atmospheres. The cable passes through a longitudinal tube, bell-mouthed at each end, and is fixed therein; in addition to this longitudinal tube each condenser has two vertical tubes, fitted with valve boxes at their upper ends, and descending to within one inch of the bottom of the condenser. One valve lever is made to act upon the two valves.

A "counterpoise or additional weight," is thrown off from the condenser by the resting on the ground of a length of chain until the specific gravity of the condenser, with its attachments, is equal to that of the surrounding element. A certain quantity of water is let into the condenser, and above that air is condensed. The sinking of the apparatus may be adjusted by the quantity of water admitted, and not by the weight. The position of the condensers is indicated by a line of buoys. To raise a condenser to the surface, its lever is pulled upwards. The expulsion of the water from the highly-charged vessel makes it sufficiently buoyant.

" Messages may be sent from mid ocean along one or all of the " said wires" by means of small insulated branch wires carried to the buoy.

[Printed 1*s*. 4*d*. Drawings.]

A.D. 1865, October 20.—N° 2705.

MIDDLETON, Empson Edward.—" An improved method of " laying submarine telegraphic cables or wires."

This method "consists in buoying or supporting them at "regular distances," "at a stated or convenient distance below "the surface." Having laid the heavy shore end, which rests at the bottom of the sea, "the cable is thereto attached, and should "be constructed as light as possible consistent with sufficient "strength to maintain its own weight when laying in a curve "between the floats or buoys whereby it is supported. The float "nearest the shore end should be attached to the cable as soon as "sufficient has been paid out to allow of the cable resting firmly "on the ground at the bottom," and should be anchored; but the following floats "should be so constructed that their specific "gravity will enable them to support the cable, say, at the "distance of one hundred feet from the surface, and may or may "not be anchored to the bottom as shall be found expedient."

The float is very long in comparison to its width, and consists of two balks of timber, between which, longitudinally, the cable is secured, the top one being thicker than the lower one. By means of cross beams, a frame is bolted to the said balks, and cork is placed in the frame, in the spaces thereof. To check the tendency of the cable to draw the floats from their places, a flat surface of board is placed underneath certain floats, at right angles to the direction of the cable; the said surface may not be required in all cases, and is only an accessory. "The floating power of "every buoy should be in excess of the weight it has to bear, for "such excess will correct itself."

[Printed, 10d. Drawing.]

A.D. 1865, October 21.—N° 2733.

PARKES, Alexander.—"Improvements in electric telegraph "conductors."

Tubular conductors of copper are strengthened "by internal "cores of steel or iron or aluminium bronze, such interior "strengthening cores being drawn or extended with the copper "conductor." When iron cores are used, their ends are connected together by welding, and when aluminum bronze cores are employed, their ends are hard-soldered together; a split tube of copper, or a flat tape of copper, is then applied over each joint and fastened by soldering with silver solder. "These conductors "are then coated with any of the ordinary insulating substances, "but the compound called 'parkesine' is preferred, and when

" using this description of compound it is found that the propor-
" tions should consist of about 100 parts by weight of dissolved
" cotton, 100 to 150 parts of oil (preferring castor oil), and 50
" parts of camphor."

In practice, an annealed and clean iron or steel rod is introduced into a seamless copper tube that will just receive it freely. By means of rolling and drawing processes combined, a wire of the desired size is made from the compound rod, the material being carefully annealed after each operation. It is preferred, as far as possible, to make the joints "before the conductor has been "reduced to a small diameter, and as soon as the copper tube "has thoroughly closed on the inner rod." The drawing down operations are continued after making the joints.

[Printed, 4d. No Drawings.]

A.D. 1865, October 26.—N° 2762.

WILDE, HENRY.—" Improvements in the construction and " working of electric telegraphs, and in apparatus connected " therewith, partly applicable to other purposes."

1st. " An improvement in the electro-magnetic induction ma-" chine," described in No. 3006 (A.D. 1863).—" A short circuit " is made between the coils of the small magneto-electric machine " and the coils of the electro-magnetic " machine whenever the commutator on the axis of the arma-" ture of the small magneto-electric machine is at the dead point." The commutator that effects this consists of two semicircular discs, insulated from one another, and mounted in the same plane upon an axle which revolves in a bearing at the end of the magnet cylinder; the terminals of the armature coil are respectively connected to the said discs. The polar terminals of the magneto-electric machine are connected to springs that bear upon the edge of the discs, each terminal being connected to two springs, one longer than the other. The commutator is lubricated by a pad in a trough of oil. The coils of the large armature of the electro-magnetic machine are of sheet copper, the whole width of the armature. The armature is of cast iron, and has a slot extending three-fourths of its length. The coils of the electro-magnet of the electro-magnetic machine may be excited by another electro-magnetic machine, which is excited by a magneto-electric machine or other source of electricity. The magneto-electric machine

described in No. 516 (A.D. 1863), or the electro-magnetic machine set forth in No. 3006 (A.D. 1863), with or without the improvements herein described, may be used "for the electro-" deposition of metals from their solutions."

2nd. "An improvement in the construction and working of " uninsulated submarine metallic cables."—"The cable to be " submerged is of large sectional area, and is made of ordinary " galvanized iron wires, and is laid down in sections," as described in No. 2997 (A.D. 1861); "and instead of the electro-" magnetic induction machine being discharged by means of a " return cable," as in No. 3009 (A.D. 1863), "or a prolonged " conductor extending to some distant station at which telegraphic " communication is required," as in No. 2997 (A.D. 1861), "one " pole of the machine discharges itself by means of a prolonged " uninsulated conductor of shorter length and smaller sectional " area than the main cable, to which the other pole of the machine " is connected, and through which it is discharged, and the " signals are transmitted between the two stations by breaking " contact or short circuiting the induction machine at the sending " station." "One extremity of the coils of the receiving instru-" ment at the distant station is connected to the prolonged un-" insulated conductor at that station, and the other extremity of " the coils is connected with the cable through which the signals " are transmitted."

[Printed, 10d. Drawing.]

A.D. 1865, October 26.—N° 2765.

SMITH, WILLOUGHBY.—"Improvements in testing and working submarine electric telegraph wires."

This invention consists of arrangements "whereby during the " laying of the submarine telegraph a constant insulation test " and communications from the ship to the shore and from the " shore to the ship may be maintained, and whereby the tele-" graph wires may be worked after the laying thereof. On " board the ship I place the cable in communication with a " galvanometer, and this galvanometer with a battery with a " wire going to earth as has been already done." "I connect " the shore end of the cable with a resistance apparatus connected " with a galvanometer which is in communication with the earth. " I also employ and apply by means of a key to the shore end a

" current from one of two resistance coils or condensers of dif-
" ferent power for the purpose of speaking to the ship. For
" speaking from the ship to the shore reversed currents are
" transmitted from the ship."

To work this system during the laying of the cable, the Drawings show the following arrangement :—The shore end of the cable is connected to alternate plates of a condenser, the remaining plates being connected to a delicate mirror galvanometer and thence to earth. Signalling from the ship is thus ensured, and that without interfering with the insulation test. Resistance coils may also be connected with the shore end and with the earth—serving as the " continuity " test, and to speak to the ship—by means of a key or keys, without altering the deflection of the said galvanometer. The end of the cable in the ship is connected to a galvanometer not so delicate as that above-named, and may either be charged from the copper or zinc end of a battery, two keys and two batteries, with earth connections, being connected to the free end of the galvanometer for that purpose.

To work through the cable after it has been laid, the following arrangement is shown :—The end of the cable is connected to a condenser, the other terminal of which is connected with the earth through a galvanometer; a battery and its galvanometer, and an " artificial cable " and its galvanometer, can also be connected to the cable, as required, by means of a key, the free terminals of the two latter galvanometers being in connection with earth plates. Each end of the cable has a similar arrangement.

To telegraph through the latter system, the operator at the sending station brings his battery into circuit, and thus causes the needle of the galvanometer of the condenser at the distant station to deflect, " and the operator there at once connects his " battery to the line," "and is thus ready to receive." On noticing the consequent increase of deflection at the sending station, the operator there releases the key from the batteries, and brings the " artificial cable " into circuit for a given time. The increase of the deflections of the galvanometers of the " artificial cable " (at the sending station), and of the battery (at the receiving station) respectively, " are in proportion to the length of time allowed for " contact," consequently the same letter, or angle of deflection, will be indicated at the same time on both galvanometers, and will form the signal conveyed. The line is " never charged except " from the copper plate of the battery."

[Printed, 10*d*. Drawing.]

A.D. 1865, November 4.—N° 2845.

RADCLIFFE, Henry (*a communication from Samuel Cornwallis Amesbury*).—" Improvements in apparatus for effecting " communications between the passengers, guard, and engine " driver in railway trains, and for giving notice to engine drivers " in cases of accidents."

1st. Communication between a passenger and the guard.—The pulling of a handle in the carriage completes an electric circuit, and thus causes a bell to ring in the guard's van. The wires of communication " are laid lengthwise above the carriages," and are brought into connection either by the couplings or by means of projecting springs. At the same time, by mechanical means, a flag is shown and a light exposed. The depressed handle can only be released by the guard.

2nd. Communication between the guard and engine driver.—Teeth or springs are arranged " in combination with wires for " completing an electric circuit," and a bell on the engine is caused to ring " by the deflection of a lever connected to the said " teeth or springs."

3rd. " Self-acting apparatus whereby an alarm is given to the " engine driver in the event of any portion of the train becoming " accidentally detached from the rest."—Electrical clockwork apparatus, on the engine, is " kept from action on a bell by the " tension of an electric magnet." When the circuit is broken, the electro-magnet ceases to act, a spring collapses, and a bell is set in motion. In this case the electrical communication may be effected by a single wire passing from the guard's van to the engine, " the return current passing in this case along the rails." Any accidental breakage of the circuit actuates the apparatus.

[Printed, 4*d*. No Drawings.]

A.D. 1865, November 13.—N° 2914.

MOSELEY, Walker.—(*Provisional Protection refused.*) " An " improvement in electric telegraphy."

" The object of this invention is to facilitate and expedite the " sending of telegraphic messages by using metallic types with " the signs in relief, so that by passing them at a regular pace " past a metallic point which makes and breaks the circuit the " same signs are indicated at the destination as quickly as they " can be received. The principle can be adapted to either the

" needle telegraphs or the Morse telegraph, but I prefer the " 'Morse' telegraph, as the Morse receiving instrument and the " 'Morse alphabet,' with this method of sending, would be simpler " and quicker than those at present in use."

[Printed, 4d. No Drawings.]

A.D. 1865, November 15.—N° 2941.

WELLS, Arthur, and HALL, Walter. — (*Provisional Protection only.*) "Improvements in submarine electric telegraph " cables, and in machinery employed in the manufacture and " submergence thereof."

" Our invention consists in relieving the conducting wire or " wires of tensile strain by combining with it or them one or " more iron or steel ropes covered or not with hemp or other " fibre saturated or coated with pitch, tar, asphalte, or other like " protecting material, as hereafter explained.

" We take one or more insulated telegraph conductors and pass " it or them together with one or more iron or steel ropes as above " named through machinery consisting of revolving heads carry- " ing one or more bobbins charged with hemp or other fibre or " binding agent. Each head is independent of the other, and is " capable of being thrown in and out of gear with a shaft or " drum made to revolve by the revolution of the stern wheel, over " which the cable passes into the water; the friction of the cable " itself produces the rotation of the wheel and of the heads. The " heads in revolving wrap the hemp around the insulated con- " ductor or conductors, and round the wire or steel rope or ropes. " As soon as the hemp is wound off any of the bobbins the " head carrying that bobbin is put out of gear, and the empty " bobbin is replaced by a full one. Another head is put into gear " before the binding material is run off that bobbin, so that the " wrapping is continuous. By this means the paying out of the " cable need never be interrupted.

" We do not limit ourselves to causing the rotation of the drum " driving the heads by means of the stern wheel, as in some cases " we use an engine or other agent to drive the drum."

[Printed, 4d. No Drawings.]

A.D. 1865, November 16.—N° 2948.

DE LA HAYE, John.—"Improvements in the construction of " and in the method of laying submarine electric cables."

1st. Gilding or electro-gilding copper wire conductors, to preserve them and to give them increased strength.

2nd. Passing the said wire "between corrugated metal rollers "so as to give it an undulating form;" strain on the wire is thus avoided "when it is payed out of the ship into the sea."

3rd. Protecting and strengthening the core of a cable by a tube or tubes of plaited steel wires, machinery being used to plait the same.

4th. "Giving to electric cables" "a triangular form in trans-"verse section" to prevent them from rolling or chafing. An external coating of gutta percha gives the desired outline.

5th. "Paying out from a ship along with a cable," "a rope or length made of a cheap, light, and rapidly perishable material, so "that the cable shall not run out too rapidly from the ship nor "be subjected to undue strain during the operation." The ropes respectively rise through apertures in the deck and pass over pulleys, the last of which that carry the cable are supported by an inclined plane, and can be brought together, so as to regulate the speed of the passing out of the cable. A twine box is revolved round the two cables, so as to tie them together as they pass into the sea.

Another improvement, only mentioned as such in the Provisional Specification, consists in surrounding the wire "with "india-rubber of a suitable thickness" which is coated "with "waterproof elastic varnish."

Another improvement, also only mentioned in the Provisional Specification, consists of plaiting, "by means of suitable ma-"chinery, common iron wires around the cable, so as to leave "three rough ridges of wire at equal distances from each other "the whole length of the cable."

[Printed, 10*d*. Drawing.]

A.D. 1865, November 20.—N° 2977.

VESCOVALI, Angelo.—(*Provisional Protection only.*) "A "new appliance of an electro-magnetic apparatus to increase the "adherence of locomotive engine wheels to the rails."

"If a great length of copper wire be wound round the axle of "a locomotive engine (either steam or compressed air engine), so "as to form round that axle a thick bobbin or coil on all its "length, and if a powerful electric current is caused to pass

"through that wire both the ends of that axle will become two "magnetic poles as well as the wheels; a force of attraction will "consequently be generated between the wheels and the rails; "that force of attraction can be very considerable, and will pro- "duce an adherence which will prevent the wheels from sliding "on the rails, without however opposing any resistance to their "circular motion; in other words, the wheels will find themselves "strongly fixed to the rails, without however being prevented "from turning."

The following requisites are put forward :—

1st. "That the axle and the wheels bearing the copper wire" "should be of soft iron."

2nd. "That the wheels should be all solid."

3rd. The wheels may have a steel tire (if it is not too thick); the rails must be of soft iron.

4th. An additional small pair of wheels and an axle (all of soft iron) act "as an anchor for the magnetic circulation."

5th. The said additional pair of wheels may also be suitably magnetised by means of a "coil of copper wire."

6th. "The pillow blocks, the supports, that portion of the "plate that is opposite to the wheels, and the connecting rod, "should not be made of iron."

7th. The bobbin or coil should be formed "into several con- "centric zones independent of one another."

[Printed, 4d. No Drawings.]

A.D. 1865, November 23.—N° 3008.

CHADBURN, CHARLES HENRY. — "Improvements in tele- "graphic inking and marking instruments."

This invention is chiefly applicable to the Morse receiving instrument, and consists in marking, with dots and lines, a tape, as the same is drawn forward by clockwork.

"A revolving disc or cylinder of black lead, or of wood, metal, "or other material, coated with blacklead," "is caused to re- "volve by being placed on a revolving axis in connexion with the "clockwork used to actuate the drawing rollers for drawing the "ribbon of paper or other material. The slip of paper or other "material is drawn by means of the drawing rolls in an hori- "zontal direction underneath the vertical revolving disc or "cylinder," "but which slip of paper or other material is not in

"actual contact with the revolving disc or cylinder, except when "it is elevated by means of an inverted guillotine block, the "upper surface of which carries a transverse horizontal blunted "knife edge, or tracer, of any convenient shape." This sliding block works in vertical guides, and is risen up by a "forked "tongue" at the outer or free end of the armature lever, whenever the electro-magnet is active; a portion of the paper is then brought into contact with the disc. When the electro-magnet is inactive, a reaction spring draws down the "guillotine block." The desired arbitrary characters are thus marked upon the paper strip by the joint action of the operator at the sending station and the clockwork at the receiving station.

It is preferred to rotate the disc "in the opposite direction to "the drawing rollers." If preferred, the disc may be brought down upon the paper, instead of the paper being moved up to the disc, as set forth above.

[Printed, 10d. Drawing.]

A.D. 1865, December 5.—N° 3121.

PREST, John, HARRISON, Henry, and ROEBER, Bernhard.—"Certain improvements in insulators for electrical "purposes."

This invention "is designed to prevent the moisture which "accumulates on the insulators from forming vertical streams."

The improvements are :—

1st. "The novel application and use of horizontal surfaces for "the purposes of 'insulating,'" "upon which horizontal surfaces the moisture will collect in separate drops; as in that "position they cannot combine and form a stream, they will fall "singly to the earth, and not form conductors between the wire "and the earth."

2nd. "Combining any two insulating materials which have "different specific heat or temperature, as, for instance, glass and "shellac, so as to form one surface, and which placed alternately "constitute a series of local terminal currents, caloric circuits, or "boundaries, and which form at the line of contact comparatively "dry spaces between the drops of moisture, and prevent the "electrical current passing from drop to drop."

The Drawings show vertical sectional views of the improved insulators. In one instance, several internal concentric cylindrical

cavities are formed in the bottom of the porcelain insulator; these have vertical surfaces with horizontal planes at their uppermost parts, and the said horizontal planes are formed of shellac. In another instance, only one horizontal ring of shellac is combined with the said vertical surfaces. In a third instance, the rings of shellac entirely fill up the cavities, and have their lower and exposed surfaces flush with the lower surface of the insulator.

[Printed, 8*d*. Drawing.]

A.D. 1865, December 8.—N° 3154.

HOLMES, NATHANIEL JOHN (*partly a communication from Matthew Fontaine Maury*).—" Improvements in the applications " of electricity for the testing and discharge of torpedo mines, " either on land or at sea, and in the apparatus connected " therewith."

1st. Testing the effective condition of the torpedo, and of its connections, without risk of explosion.—The fuse is cut out of the circuit by a "bridge" of fine platinum wire, through which the intense testing current easily passes, but which is impassable by the "igniting or accumulated current." In the Final Specification, it is stated that to ensure that the "bridge" shall be the only path for the passage of the testing current, "a gulf, or " broken circuit" (that does not impede the passage of the igniting current) is "interposed between the fuse and the bridge " connection."

2nd. Telegraphing by "tension" currents, sufficiently powerful to explode the mine, "were the" "short circuit conductor " removed from the fuse."

3rd. Exploding the torpedo or torpedoes at will, by "ac- " cumulated currents" only, "tension" currents alone being used to test or to telegraph.

4th. Exploding the torpedo only when the vessel is "within " the area of its destruction," and not otherwise.—The electric circuit is completed or broken "for the transmission of the " accumulated charge" when the enemy either enters or leaves the area of destruction, the locality of the said area being ascertained by cross bearings and the concurrence of two operators being necessary for the explosion.

5th. When a torpedo cannot explode, with effect, from the bottom of the water—bringing it into a suitable position "when

"the enemy makes his appearance."—The buoyant torpedo is attached by a rope to a fixed shell, so as to float at the proper depth; on the ignition of the fuse in the shell, the said shell bursts, and the torpedo "floats up to its normal position ready "for ignition." The fuse of the shell is ignited by an electric current.

6th. When the current is strong, using the velocity of the stream "as a motive power for raising the torpedo."

7th. Insulating the electric circuits and fuse arrangements within the torpedo "from the torpedo case and charge."—This is facilitated by the parts of the torpedo which are "constructed "and combined upon an ascertained and well-defined principle."

8th. Preventing the explosion of the torpedo by the enemy, even if he has got hold of one end of the metallic conductor.—A metallic wire is employed for the return circuit, and "the circuits "at the firing and speaking stations" are always kept "broken "or open circuits," which can only be closed by the operator, at his range, with the concurrence of another operator or observer.

Several torpedoes may be simultaneously tested, telegraphed through, and discharged, by means of this invention.

Intelligence of the breakage of the conducting wires by the enemy may be given to the observers, by continuously passing "tension" currents "through the wires in connection with alarm "bells, contrived to ring only when the current is interrupted, "and so give notice of any successful attempt to destroy the "circuits."

[Printed, 6d. No Drawings.]

A.D. 1865, December 9.—N° 3180.

BOGGETT, WILLIAM.—(*Provisional Protection only.*) "Im-"provements in the construction of wire conductors for electro-"telegraphic purposes."

1st. A central round copper wire is covered longitudinally by a flattened wire or fillet, one end of the said fillet being enfolded "lengthways round one end of the wire conductor;" this combination is then drawn through a suitable drawplate, and a uniformly smooth and closely adhering cover to the central wire is thus formed. "When the end of the first length of inner wire "is reached," it is connected "with another length, either by a "long scarf or dovetail joint," and the outer covering is con-

tinued over it; "when the end of the flat wire is reached a second "length is added bringing the two into contact."

2nd. A number of small copper wires are enclosed "within a "flatted wire or fillet as previously described." The said small copper wires are hexagonal in transverse section.

3rd. A round copper wire is surrounded "by a circle of small "wires of square or other approximate section;" the whole is enclosed "in a longitudinal cover or fillet in the manner herein-"before described."

4th. Into each of the grooves formed in a round copper wire which has been corrugated lengthways ("in the shape of pinion "wire"), a small wire of suitable size is laid; the whole is then enclosed "in an outer covering as previously described. In each "case the outer covering or fillet may be amalgamated with "quicksilver in order to diminish induction."

Other metals besides copper, also alloys, may be used for the outer covering or fillet.

[Printed, 4*d*. No Drawings.]

A.D. 1865, December 11.—N° 3192.

BERRENS, Theophilus.—(*Provisional Protection refused.*) "Improvements in manufacturing and laying down submarine "telegraphic cables."

An insulated core of steel wire is surrounded by five insulated copper conductors; the core consists of three or more wires, and each conductor of three twisted copper wires. The interstices between the conductors are filled up with strands of hemp, and the whole is bound together with hemp impregnated with non-conducting material. The cable is then "bound spirally" with another coating of impregnated hemp, rolled between rollers, and jacketed with "rounds of iron or copper tinned wire."

The above-described cable is laid, in comparatively small depths, by means of a floating pontoon, towed by the paying-out ship.

In a deep-sea cable, the steel wire core is stronger than in that for small depths, and the whole cable has greater strength and compactness. A binding of tinned wire is preferred to the above-mentioned jacket.

In addition to the means of submerging before described, hollow copper floats, filled with sulphuric ether, are "attached to "the cable at distances of about one mile" and so that they may

be disengaged at about 150 yards from the bottom of the sea. The disengagement is effected by means of a winch attached to the bottom of each float, "the drum of which is wound up pre-"vious to the submersion of the float." The cable is attached to the latter by "a key connected with the winch." A balance weight, at the end of a rope, sets free the winch, as soon as it comes in contact with the bottom of the sea, and releases the float from the cable. The floats are afterwards collected and returned on board the ship.

[Printed, 4d. No Drawings.]

A.D. 1865, December 16.—N° 3260.

READE, Cecil Loftus Wellesley.—(*Provisional protection only.*)—"Improvements in obtaining motive power applicable to "various useful purposes."

"This invention relates to certain improvements in obtaining "motive power by magnetism or gravitation, or both combined, "applicable to various useful purposes, including magnetic or elec-"tric clocks. I propose to construct an iron wheel with radial "spokes and central box or hub, which is to be set on a shaft "supported by standards or bearings; on the circumference or "outer periphery of this wheel I apply eight or more tangential "hammers or armatures; they are attached by hinges and are in "the forms of arcs to correspond with the periphery of the wheel. "Thus, in whatever position the wheel is placed, it will follow "that all the armatures above the level of a horizontal line drawn "through the diameter of the wheel will be closed or concentric "with the circumference, while the others will be open or in an "outward or extended position, thus creating a leverage and "causing the wheel to be out of equilibrium, that side of the "wheel on which the hammers or armatures are extended will be "borne down, thus bringing over the successive armatures, and "creating a continuous rotary motion, while the ascending arma-"tures will fall against the opposite side of the wheel, and not "exercise any counteracting leverage to the descending series. "The foregoing is an example of the power of gravitation, but "where I desire to aid the motion by electricity or magnetism, I "propose to apply a series of electro-magnets around and outside "the wheel and armatures, whereby the armatures will succes-"sively be attracted during the revolution of the wheel, and thus

" create a continuous motive power. By an application of clock-
" work movement the speed of the wheel may be easily regulated,
" and thus the power obtained may be made applicable to time-
" keepers."

[Printed, 4*d*. No Drawings.]

A.D. 1865, December 19.—N° 3282.

NEWTON, Alfred Vincent (*a communication from Laban Clarke Stuart*).—" Improvements in electro-magnetic engines."

In this invention the poles of the magnets are changed at each impulse. A fixed cylindrical frame carries horseshoe electro-magnets, radially disposed, and with the line joining the poles of each magnet parallel to the axis of the cylinder. Another circle of radiating horseshoe electro-magnets are mounted on a shaft concentric with the cylindrical frame, and their poles are placed very near to the poles of the fixed electro-magnets. By magnetising all the cores of the electro-magnets, so as to make them alternately north and south poles, the attraction and repulsion thence derived give the impulse required to rotate the inner series of electro-magnets and the shaft to which they are attached.

The invention is divided into two parts :—

1st. The above-described arrangement of moveable electro-magnetic poles concentric with and very near to fixed electro-magnetic poles, also an arrangement of winding the coils of the electro-magnets (square cores being preferred), so as not only to act upon the enveloped core but also—with an opposite polarity—upon the adjoining cores. For this purpose the spaces between the cores of the electro-magnets are filled with wire.

2nd. " A mode of reversing the polarity of the magnets without " breaking connection between the plates of a battery."—Rings (with projecting sections) on the shaft, and fixed spring rollers, are suitably connected respectively with the terminals of the coils and with the battery poles ; the rollers do not leave the projection of one ring until contact has been made with the projection of the other ring.

[Printed, 1*s*. Drawing.]

A.D. 1865, December 21.—N° 3299.

BOGGETT, William.—" Improvements in the construction of " wire conductors for electro-telegraphic purposes."

According to this invention, several small copper wires are used to make one conductor, but they are so perfectly in contact throughout their length that the increase of inductive action that would otherwise take place is avoided.

1st. Two half-round copper wires are taken, "one of them "having on its inner or flat side a recess slightly undercut, and "the other a corresponding projection." "When the two are "placed together and passed through a draw plate," they "be-"come equal to a solid wire for the intended purpose." As the joints of each half-round wire are wide apart, neither break of continuity occurs nor soldering of joints is required. It is preferred to construct these compound wires "by combining and dove-"tailing three segments or lengths of wire together."

2nd. A flat copper ribbon is used to cover "one or more other "wires." The end of the ribbon is enfolded "lengthways" round the wire or wires to be covered, and the compound wire thus formed is drawn through a draw plate. In one instance, round wire forms the centre, and is enfolded as above set forth; "scarfe" joints connect the round wire, and the ribbon is continued over it and joined by contact. In a second instance, a number of small wires (of hexagonal cross section) are enclosed within the said ribbon. In a third instance, a round wire is surrounded by a circle of small square wires, and the whole is enclosed in the said ribbon. In a fourth instance, wire in the shape of pinion wire has small wires laid in its recesses, and the whole is enclosed in the said outer covering.

A screw thread, bound over with copper wire, gives strength to the joints.

[Printed, 8d. Drawing.]

A.D. 1865, December 26.—N° 3339. (* *)

DEANE, William Francis.—(*Provisional protection only.*)— "Improvements in the means of applying copper or alloys of "copper to the bottoms and sides of navigable vessels built of "iron, steel, or homogeneous metal." This invention consists "in applying a solution of copper (by preference sulphate of "copper) to the surfaces to be acted upon by means of a water-"proof material, which is secured to the vessel, either by adhesion "or by mechanical means. The iron or other metal to be covered "is coated with plumbago, or otherwise prepared to receive the "deposit of copper, or the alloys thereof, either by contact or by

"insertion of zinc in the copper solution, or by the usual "galvanic, electric, or other process, by which copper is deposited "from a solution when acted upon by the galvanic, electric, or "other battery, or by whatever means the same may be applied. "The copper or the alloys thereof may be deposited in any thick-"ness, according to the strength, quantity, and time occupied in "applying the same, and the surfaces acted upon may embrace "either the whole side, or bottom, or any portion of them. Any "ironwork which it may be thought expedient to cover may be "done in the same manner. By the terms waterproof material "are included vulcanised india-rubber, cloth, and all fibrous "substances suitable for holding and applying copper solutions, "as herein-before described."

[Printed, 4d. No Drawings.]

A.D. 1865, December 27.—N° 3346.

GRIFFITH, Samuel.—"Improvements in machinery for paying "out and hauling in or picking up, particularly applicable to "paying out and hauling in telegraph cables."

This invention "consists in the employment in machinery for "paying out and hauling in of two drums, the axes of which are "set" [at?] "an angle to each other. The cable which is being "payed out or hauled in passes under or over the first dum" [drum?], "then under or over the second, back to the first, and so on "for as many turns as may be required. Owing to the drums being "set at an angle to each other, the turns of the cable are separated "or freed from each other without the use of the 'knife' or other "appliance which is generally adopted for the purpose. The "drums may be horizontal, vertical, or otherwise."

The Drawings show a side elevation, end elevation, and a plan of the above-described arrangement. The angle at which the axes of the drums are set to each other is small.

[Printed, 6d. Drawing.]

A.D. 1865, December 27.—N° 3347.

SILVER, Hugh Adams.—(*Provisional Protection only.*) "Im-"provements in the manufacture of electric conductors insulated "with india-rubber."

"My invention consists in manufacturing electric conductors "insulated with india-rubber in the following manner:—I first

"cover the conducting wire or wires with pure india-rubber; I "then cover this pure india-rubber with india-rubber compound "prepared for vulcanization. I place the wire so covered in a "semicircular mould, and place a corresponding semicircular "mould upon it, and I submit it to the action of heat in a press "provided with upper and lower steam chambers. The covered "wire is submitted to the action of the press in lengths of, say, "ten feet, more or less, and for a time varying from 10 to 20 "minutes, more or less, according to the extent of vulcanization "required; and when one length has been operated upon I draw "it through, so as to bring the next length under operation. The "conductor thus formed may be covered or not in any ordinary "manner for protecting the india-rubber."

[Printed, 4d. No Drawings.]

A.D. 1865, December 28.—N° 3354.

HUBERT, FRANCOIS THIERRY.—(*Provisional Protection refused.*) "Improvements in the construction of general electric "typo-omnitelegraphic machines, and in the mode of working "them."

These machines transmit and receive simultaneously, with one apparatus at each end, messages, drawings, &c. At the sending station, the writing in insulating ink is made upon metallic paper; this is received, at the receiving station, in blue upon a white ground, upon paper prepared "with yellow cyanure of potassium "and iron, with cristallized azotate of ammoniac." These machines are worked with one telegraph wire.

The regular action of the machines is obtained by means of a horizontal lever provided with a sealed tube containing quicksilver, in conjunction with electro-magnets that are active and non-active at each oscillation of the pendulum of an electric clock. A weight, hanging from a cylinder to a rope coiled thereon, gives motion to the machine.

The machine consists of a cast-iron pedestal, upon the slides of which the mechanism moves. The upper part of the instrument works on the frame of the said mechanism upon two steel slides, "in its width." The said frame carries a double contrary-threaded screw, escapements, levers, and springs. Ratchet wheels, connected with the said screws, direct the tables of the instrument backwards and forwards respectively. "Another double

"frame" supports "two isolating tables moving in two contrary "directions;" the said "isolating tables" carry the metallic paper as well as the chemical paper. When (in the transmitting portion of the instrument) the style is in contact with the insulating ink, its tail completes the telegraphic circuit, and causes a mark to be made on the prepared paper at the distant station.

Other details and appurtenances are alluded to.

[Printed, 4d. No Drawings.]

A.D. 1865, December 28.—N° 3357.

VARLEY, Cromwell Fleetwood.—"Improvements in the "construction of telegraphic cables or conductors."

To prevent a fault in the insulator from causing the solution of the copper conductor by electrolytic action, one or more wires of the strand of the said conductor is or are made entirely or in part of platinum, or the conductor may consist of a copper tube with a platinum core drawn down into wire. One or more of the "spirals," or helically-coiled wires, in each joint, is made of platinum.

In long cables, the conductor is made "smaller and smaller" as it approaches the centre of length of the cable, and "in passing "from the shore towards the centre" the thickness of the insulator bears "a continually increasing ratio to the diameter of the "conductor."

"To render the insulated conductor less liable to injury from "abrasion," strips of woollen fabric, saturated with Chatterton's compound, are employed, "either in part or entirely."

The Final Specification also sets forth the following points:— When a fault in the insulation occurs, in order to preserve the copper of the conductor, the employment of condensers in conjunction with a battery having a great number of cells "of small "dimensions and of great resistance, so as to keep the cable "always negative to the earth." "This will keep the copper at "the exposed part of the cable always electro-negative, and the "condensers, while they cut off nearly the whole disturbance "arising from earth currents, still permit the signals to pass "freely from end to end;" should any earth current "exceed that "of the battery the latter should be immediately disconnected, "and the cable left to the partial protection afforded by the

" condensers." It will be advisable to insert a galvanometer in " the battery circuit, to give notice should the earth current over- " power it."

[Printed, 4d. No Drawings.]

1866.

A.D. 1866, January 3.—N° 24.

ROBERTSON, George Sinclair.—" Improvements in the " manufacture of telegraph standards, fencing posts, and signal " posts."

This invention consists in manufacturing the said standards and posts " of corrugated iron."

The upper part of the telegraph standard has " a castiron cap " and arms fixed thereon suitable for receiving ordinary insula- " tors." The form of " the hollow iron casting used for the foot " and which is buried in the ground," " may be varied but it " should be made with corrugations or flutes corresponding with " and suitable to fit the corrugations of the lower end of the " corrugated tube. In order to give greater holding in the " ground the foot is cast with horizontal openings through it for " the reception of horizontal bars which project radially to any " desired extent. In making the corrugated or upper portion" " of a standard or post, the sheet iron is to be cut to the dimen- " sions and taper required according to the size of the post or " standard. In corrugating the sheet iron a sufficient width is " left at the two edges to overlap, and these are to be punched to " receive rivets. The requisite tubular form may be given to a " plate in the act of corrugating it. External hoops are used " which may be plain or corrugated, and they may be rivetted and " plain, or corrugated bands may be introduced at intervals in " the interior when desired, and they may also be rivetted; or " when the corrugated upper part of a standard or post is coated " with zinc after it has been put together, the zinc will securely " hold the external hoops and also the internal strengthening " rings (when used) in their places."

[Printed, 8d. Drawing.]

A.D. 1866, January 10.—N° 89.

BAINES, WILLIAM.—(*Provisional Protection only.*) "Im-
" provements in the manufacture of telegraphic and signal pillars
" or posts."

"In constructing pillars or posts for telegraphic purposes and " for signalling on railways each pillar or post is formed of a " cross-like section, but tapering from the lower to the upper end " on one side, whilst on the other the edges are parallel, by which " construction a post or pillar will consist of a tapering plate " having on each side of it a projecting rib of equal width from " top to bottom. In some cases in place of a post or pillar having " only one rib on each side, I form the tapering plate with two " parallel ribs on each side. In making these pillars or posts I " prefer to roll sheets of iron or plates of a width sufficient for " two or more posts or pillars with projecting ribs on each side of " such sheets, and then to cut out the posts from such rolled " sheets or plates, or a single post or pillar may be produced by " rolling, and then the central plate reduced by cutting the " parallel plate into a tapering plate. In order to form a foot to " such a post I split the lower end for a short distance and turn " out the fore parts at an angle to the vertical line of the post or " pillar; this foot together with part of the lower end of the " post is to be buried in the earth, by which the requisite fixing " of the post or pillar will be obtained. In applying such pillars " or posts for supporting telegraphic wires the widest part of the " post or pillar is fixed in a position at right angles with the line " of the wires."

[Printed, 4*d*. No Drawings.]

A.D. 1866, January 11.—N° 96.

RUDLING, WILLIAM ATKINS.—(*Provisional Protection only.*)
"Improvements in apparatus to be used for protecting property
" from fire and thieves."

The object of this invention is to give notice of fire and thieves at a distant station. This is accomplished by means of electrical communication, an alarm bell and indicating dial being used at the station.

On the violation of the safe, the circuit of a galvanic battery therein is broken, the armature detent of a train of wheelwork in the indicator "is liberated, the alarm bell rings, and the indicating

" dial points that 'thieves are in the house.'" In the commutator, two pieces of brass tube, in a line with each other but separated by means of ebonite, are fitted with covers and spring pins; the spring pins are tipped with platinum, and their contact (when the safe is closed) establishes the electric circuit, which shows that the premises are safe at the dial of the distant station. Other means of causing forcible entry to break the electric circuit are set forth.

In one "calorimeter," two strips of different metals, which are respectively of dissimilar rate of expansion by heat, are rivetted together at one end and left free at the other; the separation of the springs by heat breaks the circuit.

In a second calorimeter, the heat raises a column of mercury in a tube, and causes the adjusting screw of the float rod to lift a spring off a stud, and thus to break the circuit.

In a third calorimeter, the melting of a fusible wire breaks the circuit.

Shutters of different colours, operated by the electro-magnet, indicate the safety or danger of the premises.

Chains and pulleys in the telegraph pipes enable additional wires to be laid without disturbing the said pipes.

[Printed, 4d. No Drawings.]

A.D. 1866, January 13.—Nº 119.

BROOMAN, Richard Archibald (*a communication from Hippolyte Huriaux and Lucien Faille*).—"An improvement in " spring tops."

"This invention consists in magnetizing the head or barrel of " spring tops, so that the top may be suspended thereby while " spinning. The spring top to which this invention is chiefly " intended to be applied is composed of two parts, namely, the " body or top proper, and the head or barrel, by means of which " the top is spun. The head contains for this purpose a spring, " which is wound up or tightened by the rotation of the barrel " when in place and engaged on the rod of the top. By the dis- " engagement the spring being freed becomes relaxed, and pro- " duces the rapid rotation of the top which separates from the " barrel. The spring, therefore, performs the double function of " imparting the rotation and of releasing the parts."

" By winding up the spring" "on itself by means of the barrel " the barrel can be raised or lowered in relation to the spindle,

"and then the barrel and the spindle are in such position that "the unwinding of the spring not only causes them to turn on "their own axes, but also brings them nearer each other."

The upper end, preferably, of the spindle is magnetised. By means of this magnetisation, when the top is spinning, it can be suspended by its rod from the barrel, "and it can be caused to "spin in any desired position in relation to the barrel."

[Printed, 8d. Drawing.]

A.D. 1866, January 15.—N° 127.

COMFIELD, THOMAS, the younger.—(*Provisional Protection not allowed.*) "Stopping and preventing slip from wet rails of "locomotives and railway trains, and stopping carriages generally, "and equalising force without fly wheels."

By an "arrangement of valves" in connection with the "cylin-"ders of locomotives," and "the momentum steam chest," the pistons "reverse the nature and effect of their action without "reversing the direction of their motion;" this reversed action is maintained "at the expense" of the momentum of the engine, "and its load brings the same to a standstill."

By an arrangement in the permanent way and of a "gulvanic "currant," the inventor prevents "the slipping of those wheels "upon whose revolution the action of the retarding piston "depends." "This reversed action" causes "the steam received "from boiler" to be "returned thereto through the momentum "steam chest."

By an "arrangement of conducting pipes containing water "connected with a double-acting cylinder, and having taps," the train may be stopped.

By an "arrangement of vulcanized india-rubber, an absorbent "material, means for drying same, and heated air," the inventor prevents the slip which occurs from wet rails.

By having "an equalizing cylinder acting substantially as the "driving cylinder herein described, and whose power of equalizing "speed exceeds the extremes of the variations to be equalized," the inventor dispenses "with the use of fly wheels."

[Printed, 4d. No Drawings.]

A.D. 1866, January 15.—N° 136.

NEWTON, ALFRED VINCENT (*a communication from Max Levin*).—"Improvements in the construction of electric clocks."

In electric clocks made according to this invention, "the seconds "wheel is caused to act upon the minute wheel without any "intermediate train of gearing."

In a balance-wheel clock, "the balance-wheel arbor is fitted with "a cam which at every forward vibration of the balance wheel" brings two springs together and thus completes the electric circuit. The spring armature "of the electro-magnets is jointed to a rocking "arm which carries a clutch that embraces the seconds wheel and "is intended to move it round tooth by tooth. On the arbor of this "wheel is a snail cam which bears upon the end of a rocking lever "having jointed to its other end a ratchet tooth," which drives the minute wheel round one tooth for every complete rotation of the seconds wheel. When the snail cam has driven the rocking lever to the extremity of its arc of motion, the spring of the said rocking lever forces it back, and the minute wheel is, in consequence, driven round one tooth. To set the clock in action it is only necessary to start the balance wheel.

In a half-seconds pendulum clock. a metal arm on the pendulum has a pin which (by striking an impulse spring as the pendulum vibrates) completes the circuit, and thus actuates a jointed rocking lever to work the minute wheel, as in the balance-wheel arrangement, the upper end of the rocking lever bearing upon a snail cam on the seconds-wheel axis.

In a seconds pendulum clock, the pendulum sets in action "an "escapement lever," which works into a seconds wheel that operates the minute wheel as described above. A bell-crank lever, connected with the armature, impels the pendulum.

[Printed, 1s. 2d. Drawings.]

A.D. 1866, January 18.—N° 165.

VARLEY, Cornelius, and VARLEY, Samuel Alfred.—(*Provisional Protection only.*) "Improvements in electric tele-"graph apparatus, parts of the invention being applicable to "other purposes."

The outer case of needle instruments is made of cast iron. A bridge and spring contact maker is employed; movement of its handle to the right sends a positive current through the galvanometer, and along the line; to the left, a negative current.

The galvanometer consists of a number of segmental coils packed in a circular box, and having a magnetic pole in their

common centre. Soft-iron discs carrying radiating soft-iron bars, magnetised by the above magnetic pole as well by a second magnet, are influenced by the electric current traversing the said segmental coils, the bars being pivoted for that purpose.

The inducing magnets may be dispensed with; the bars are then made of "magnetized tempered steel."

In making relays, the axle carrying the soft-iron discs has a platinum contact piece, and the relay arm beats against gold rollers.

For quantity currents, one set of coils is between two sets of radiating bars.

In needle instruments, the galvanometer has only two radiating bars, and one inducing magnet, which is in the same plane as the surface of the coils.

A modification for needle instruments consists of circular coils arranged radially in a brass box, and acting upon a pivoted light soft-iron hoop that is magnetised by induction.

Coils of electro-deposited ribbon may be used.

For lightning conductors, in a chamber containing metallic points that are in the circuit, charcoal powder is placed. When the most perfect protection is required, the two oppositely polarized points are mounted in a glass cylinder, being prevented from touching each other by means of conical shoulders, and the air being exhausted from the interior of the cylinder. The charcoal used may be made red hot to drive out impurities.

[Printed, 4*d*. No Drawings.]

A.D. 1866, January 20.—N° 195.

HUTTON, THOMAS.—(*Provisional Protection only.*) "Improve-" ments in submarine telegraph cables and in submerging and " raising submarine telegraph cables."

Around the core is placed a layer of India-rubber or gutta percha, then a layer of cloth, then a second layer of India-rubber or gutta percha.

In submerging this cable, it is surrounded wholly "or in part " with a casing or jacket of cork," or bladders are attached to it at intervals. "On the cable being payed out from the ship " carrying it, it falls very slowly through the water, and either " sinks down to the bed of the ocean or becomes stationary at a " given depth, according as its density more or less approaches " that of the water in which it is submerged."

"The attachment of the bladders, bags, or buoys to the cable" is effected "by means of steel or other elastic rings to be fixed on "the cable while in motion from the ship or otherwise at the "required intervals. The said rings are open at top, and the "sides are provided with handles or loops, which serve both to "open the elastic rings for placing them on the cable and for "affixing the bladders, or bags, or buoys to the rings. When the "rings have been opened and placed on the cable they close upon "and clip it by their elasticity, and thus securely fix the bladders, "or bags, or buoys thereto. The bladders, or bags, or buoys can "thus be attached to the cable with ease as it is payed out from "the ship."

[Printed, 4d. No Drawings.]

A.D. 1866, January 23.—N° 222.

WIBRATTE, François.—(*Provisional Protection only.*) "A "new or improved vehicle for carrying the electric wires in sub-"marine telegraphs."

This apparatus "consists of a series of tubes supported or "carried by a chain constructed for the purpose. It is made of "iron or steel, and consists of articulated pieces, the links, each "of them bearing a tube in which are contained and protected "the electric wires, being connected by a pair of rings, in which "they turn freely and fold back one on the other."

Two plates are united by bars in the form of a link, the links being connected by two rings, "in which the plates turn freely, "so that the links may fold back one on the other." Each plate "is traversed by a hole of sufficient diameter to receive the wire "conductor of the electricity." Two shorter tubes "are also "fitted between the links, which are rivetted to the other side of "the plate and connected by a hinge," "the pin of which is also "traversed by a hole. The folding of these tubes and of the "links gives to the apparatus its especial quality, viz., that of "pliability. The interstices of the hinges are, if necessary, pro-"tected against the penetration of the water by any impervious "substance. The conductors are made of fine copper wires, "which bend without tension and fold up with the links and "tubes. These wires pass through the holes and tubes the whole "length of the chain; they are insulated from contact with the "iron by a coating of gutta percha or other substance answering "the same purpose."

[Printed, 6d. Drawing.]

A.D. 1866, January 23.—N° 227.

HOPKINS, Evan.—"An improved mode of correcting the "deviation of compasses in iron ships and of constructing ships' "compasses."

The iron vessel, when completed, is "depolarized and brought "to the normal state of iron as regards its attractive power." "The compass box with its card and gimbal," is "placed beyond "the disturbing influence of the steering apparatus or other soft "iron employed on deck; and in order that it may be seen at a "distance, say, from ten to thirty feet from the steering wheel, "like the dial of a clock, I furnish it with a reflector placed at "an angle of, say, forty-five degrees to the compass box." "In "order to allow the compass needles to conform to the direction "of the terrestrial magnetic force in high latitudes they are to "be made of a segmental form with their ends terminating at "points that indicate the average angle of the 'dip.' The de-"polarization of the hull of the iron vessel I effect on the same "principle as has heretofore been adopted in the depolarization "of iron bars in the production of magnets, but with the aid of "batteries and electro-magnets instead of the ordinary horse-"shoe magnets."

The Drawings show the above-mentioned principles applied to a vessel by means of a Grove's battery and an electro-magnet, the electro-magnet being moved over the plates of the vessel from end to end under the guidance of magnetic compasses.

The Drawings also represent two compasses about six feet apart, attached to the mizen mast, twenty feet above deck, and fitted with reflectors.

[Printed, 10*d*. Drawing.]

A.D. 1866, January 24.—N° 237.

MARTIN, Samuel Manley, VARLEY, Samuel Alfred, and VARLEY, Frederick Henry.—(*Provisional Protection only.*) "Improvements in electric telegraph apparatus."

A circle of electro-magnets is arranged on an iron plate; each pair of magnets are opposite, and have poles of different names. A permanent or induced magnet, centrically pivoted, is free to move over the poles of the electro-magnets, and it places itself over the poles of the pair of electro-magnets that is included in

the telegraphic circuit; the attraction of the electro-magnets also pulls down the permanent magnet, and, when the electric current ceases, a spring causes the said permanent magnet to fly up, and leaves it free. To assist the action of the spring, another magnet (excited by a secondary current from the first electro-magnet) is called into action upon the ceasing of the line-wire current. Circular coils may be substituted for the electro-magnets, or the iron cores of the electro-magnets need not come up to the surface of the coils. A segmental commutator, with levers or "battery "arms," is used with this instrument; when circular coils are employed, the battery arms drop through notches in an ebonite ring and make contact with the metallic segments.

One method of constructing instruments with circular coils consists in mounting two coils in "coil boxes," with "space rings" between them; the magnets are free to move on axes between the two coils.

According to another plan, the poles of the circular coils are flush with the surface of a plate in which they are fixed; the pivoted magnets work over the surface of the coils.

[Printed, 4*d*. No Drawings.]

A.D. 1866, January 31.—N° 311.

DARLOW, WILLIAM.—(*Provisional Protection only.*) "Im-"provements in electro-magnetic engines for obtaining and "applying motive power."

A series of magnets are mounted upon a ring "which is sur-"rounded by a series of 'helices,'" through which electric currents are passed, "thus causing the ring and magnets carried "thereby to revolve." The series of helices is mounted upon a disc, which is fixed upon and rotates with a central axis supported in suitable bearings. "Upon one side (or upon both "sides) of this disc a 'magnet ring' is supported on friction "rollers, so as to revolve in the opposite direction to that in "which the disc and axis is arranged to revolve." "The electric "current is formed or completed through each helix to magne-"tize the successive sections of iron forming the ring (or partial "ring) of magnets as each helix arrives on the descending side "of the disc; by this means preponderance is given to that side "of the disc by the additional weight of the magnets on the "descending side, whilst they are retained to the disc by mag-

"netic attraction. During the retention of the magnets within "the 'helices' the ring is caused to rotate with the disc and "axis, but the moment the electric circuit is broken the ring of "magnets is caused to rotate in the opposite direction to the "disc, the electric circuit having been previously completed "through the next descending helix, and so on with each succes- "sive helix. Continuous rotary motion (aided by the gravitating "power of the magnets) is thus imparted to the disc and axis, "from which the motive power thus obtained may be transmitted "through toothed wheels or other mechanism to be applied for "driving machinery for various purposes."

[Printed, 4d. No Drawings.]

A.D. 1866, February 3.—N° 338.

HORWOOD, ALBERT, and BRUMFIT, CHARLES.—(*Provisional Protection only.*) "Improvements in galvanic batteries for "keeping up constant currents of electricity for railway train "signals and electric telegraphic purposes."

"The invention for generating electricity in a galvanic battery "consists of an amalgam of zinc and mercury in addition to acids, "viz., we purefy the zinc in the ordinary way, and then place "it in a melting pot with some mercury, and amalgamate them "by fusion, and then cast the amalgam in the shape which will "be most convenient for the cell of a galvanic battery. The pro- "portions of mercury and zinc which we find give a good result "are about 5 pounds of mercury to 1 cwt. of zinc, but we do not "confine ourselves to such proportions.

"The arrangement which we prefer for keeping up constant "currents of electricity consists of a mixture of grease or oil "deposited on the surface of the acid in each electric battery cell, "so that whatever oxide may arise on the metals for the generating "of electricity the oil or grease will prevent such oxide from "forming short circuits of electricity between each electric battery "cell, and greatly diminish the local action."

[Printed, 4d. No Drawings.]

A.D. 1866, February 5.—N° 347.

WALKER, CHARLES VINCENT.—"Improvements in electric "intercommunication in railway trains."

By means of this invention, communication is established between the guards of a railway train, between guards and engine driver and between passengers, guards and driver; also, if any portion of the train should break away, intelligence is given of the same.

Every guard's van is fitted with a galvanic battery, all the batteries being of equal strength. The battery consists of platinized graphite, amalgamated zinc, and dilute sulphuric acid; in each cell, a disc of ebonite (with suitable apertures for the zinc and graphite plates) is placed on the surface of the liquid, and the cell above the disc is filled up with sawdust. The batteries are so connected that, in their normal condition, their power is balanced, and a circular switch with a cam and springs enables each apparatus to be adjusted to the position it occupies in the train.

To prevent the bell from being rung by the motion of the train, a second armature is acted upon by a front pole of the electro-magnet, and releases the hammer armature on the completion of the circuit; when the current ceases, a clutch, connected with the second armature, locks the hammer armature. In the engine bell, a semaphore arm is worked "by a magnetised needle suspended "between the two armatures."

Three different kinds of ringing key produce three different kinds of ringing "for the guards, the 'break-away,' and the "passengers respectively."

A hinged spring disc is used for an outside indicator in combination with the passenger ringing key; the said disc can be locked or released.

[Printed, 1*s*. 6*d*. Drawings.]

A.D. 1866, February 5.—N° 353.

RENNEY, WILLIAM.—" Improved means of and apparatus for "preventing oscillation and vibration of the card in iron ships "and other ships' compasses by means of friction."

This invention consists, "firstly, in the construction and manu-"facture of a bell cup or receptacle of any other form" "for "liquid or fluid, to work freely on a pivot" "with a bridge" "attached to the compass card," "the card pivot" "working in "a socket" "formed in a perpendicular standard" "in the centre "of the cup or receptacle above mentioned.

"Secondly, in the construction of one, two, or more fans" "attached to the said bridge, and so arranged with adjustment

" screws " " as to be raised or lowered at discretion; the said fans " to be wholly or partially immersed in oil, spirits, or any other " liquid or fluid" "placed in the cup aforesaid; the resistance " or friction caused by the fan or fans working in the liquid or " fluid preventing the oscillation of the compass card occasioned " by the motion of the vessel, which oscillation in the ordinary " compass very seriously affects correct steering, and is frequently " the cause of deviation in the ship's course, involving risk of " life and property."

[Printed 1s. 2d. Drawings.]

A.D. 1866, February 8.—N° 394.

DE BRIOU, HENRY EDWARD FRANCIS.—" Improved compo- " sitions for preserving metals from oxidation, corrosion, and " galvanic action; for protecting metals used in the construction " of ships against the destructive effects of sea water, and pre- " venting their fouling; for protecting wood from the attacks of " animalculæ and preserving wood from damp, rot, and decay; " for excluding damp from walls; and for use in submarine and " other telegraphy."

The sole portion of this invention which belongs to the present series of abridgments is that which relates to the use of the said compositions for " submarine and other telegraphy." A compo- sition made with vulcanised India-rubber, as described in No. 1804 (A.D. 1864), and rendered fluid by means of bisulphide of carbon, may be employed for the said purpose.

The most suitable composition contains India-rubber, vegetable pitch or asphaltum, shellac, rosin, and bisulphide of carbon. The core of submarine cables is formed of the said composition; it is passed " through semi-fluid cold paint or composition, and then " through a die to equalize the coating." " The inner covering " of the core," whether made of hemp or other fibrous material, and the outer covering when a hempen one is used, are also saturated with the paint in a very liquid condition. The outer covering of iron wires is painted with the composition. In aerial telegraphy, the composition is used " as a liquid paint for saturating " narrow bands woven with hemp or other fibrous material;" the said bands are are wound round " the conductors in order to " effect insulation and to protect the wires."

[Printed, 4d. No Drawings.]

A.D. 1866, February 14.—N° 466.

GABLENZ, HENRY ERNEST, Baron de, junior, and MAHLER, HENRY.—(*Provisional Protection only.*) "An improved con-"struction of submarine telegraphic cable for the transmission of "electric despatches."

"The said cable intended for the transmission of electric "despatches across seas, lakes, or large rivers is composed of a "central part or core of hemp, and the copper wire fluid con-"ductor is rolled up in a spiral" [helical?] "line around the said "core; the copper wire is previously lined with an insulating silk "thread.

"The cable is then strengthened inside from place to place by "iron wire bundles, and a similar wire is placed in the very "centre of the hemp core in the whole length of the cable; this "central wire can be also used for the transmission of despatches "by means of the induction fluid which is produced."

[Printed, 4*d*. No Drawings.]

A.D. 1866, February 14.—N° 469.

HENRY, MICHAEL (*a communication from the Chevalier Henry Avet*).—"Improvements in photography, and in the process of "producing printing surfaces and other like surfaces by the aid "of photographic agency."

The above-mentioned surfaces are produced by the action of light upon a thick slab of bichromatized gelatine through a collodion or other transparent photographic picture. When the parts unaffected by the light have been dissolved out from the gelatine slab, a design in relief adhering to the photographic image is obtained. "A metal surface suitable for printing and "other similar purposes (such as embossing and figuring) may "be obtained by electro-metallurgy from such relief or from an "impression taken therefrom."

Either the subject itself may be metallized and an electrotype taken from it, or the electrotype may be taken from an impression of the design in gutta percha which has been metallized.

This process may be employed for figuring porcelain, producing "grained" surfaces and obtaining superior photographs or photographic positives. The grained surfaces may be used in conjunction with the picture which is to be printed, thus producing surfaces with small convexities or concavities that facilitate the

operation of printing. To obtain from such a relief a metal printing surface, it is subjected to two electro-metallurgical operations, or an electrotype is taken from a metal mould.

[Printed, 4d. No Drawings.]

A.D. 1866, February 15.—N° 480.

NICOLL, DONALD.—" Improvements in the construction of " electric telegraph conductors, and in the method of preparing " and laying the same, also in the machinery or apparatus to be " employed therein."

An insulating material is poured into a rectangular trough or semi-tube; when the said material has set, lengths of wire are laid in the trough, and the ends thereof are left protruding at each end of the trough, to serve as connections to the next trough, and so on, from trough to trough, so as to form a continuous conductor. The helical ends of one trough may receive the straight ends of the next trough.

Two troughs are placed together, so as to form a square or parallelogram, and a boss or collar, filled with insulating material, makes the insulation sure between the two troughs and protects the joints.

In a temporary telegraph, slabs or blocks of asphalte may be cast to hold the wires, and a temporary mould may be used to form the junctions.

In carrying out the above-mentioned construction, a sufficient number of wires, cut to the requisite length, are held taut in the tube by a "winding screw," while the asphalte is being poured in. In another plan, a number of wires are coiled (as warp threads) round a drum, and are guided to the trough, and fixed there by binding screws; the asphalte is then poured in. A fixed perforated guide plate is employed.

In the Provisional Specification, it is stated that a perforated disc of insulating material is applied at each end of the trough, the holes of the discs being at equal distances to receive the conductors.

[Printed, 4d. No Drawings.]

A.D. 1866, February 17.—N° 512.

SMITH, JOSEPH.—(*Provisional Protection only.*) " Improve- " ments in apparatus used for the protection of trains on railways " by signalling."

This instrument "exhibits two signals, one 'line blocked,' the "other 'line clear,' rings a bell to call attention or indicate the "description of train signalled, starts machinery which registers "the trains signalled, and works as an ordinary printing instru-"ment."

The indications may be made by means of a fixed dial behind a moveable screen, or by a moveable dial behind a fixed screen, or by a dial and moveable pointer, or by "a model of a semaphore "or distance signal." The bell of the instrument may either be sounded by percussion, or rung by the unlocking of the apparatus through the intervention of an arm or lever. "A stylus pencil" or "Bain's printing telegraph," may be used to mark paper. The armature or needle of the electro-magnetic portion of the arrangement is connected mechanically with the indicating portion, with the hammer, with the pencil for marking the paper or other material, and with "the lock of the machinery whereby such "material is moved." The key of the instrument may make and break circuit, and has coloured plates, lettered to correspond with the dial; there is also a contrivance for keeping down "the key "which is moved in the reverse direction by a spring." The line wires and instruments are so coupled up that the indicators show the same signal at the sending and receiving stations respectively; return signals are used to confirm forward signals. The ordinary signal showing the line "blocked," is accompanied with the ringing and signals above described, while the movement caused by the breaking of the line wire is unattended by any other signal.

[Printed, 4d. No Drawings.]

A.D. 1866, February 19.—N° 514.

MUIR, MATTHEW ANDREW, and McILWHAM, JAMES.—(*Provisional Protection only.*) "Improvements in and relating to "fence, gate, and telegraph posts."

This invention "consists principally in forming the lower parts "of the post with one or more screw-shaped or helical flanges or "blades.

"In one modification the post or post foot is formed with a "horizontal, circular, or other shaped flange to bear upon the "surface of the ground, and below this there projects downwards

" a central shank or spindle which has a screw-shaped flange " formed on it at or near its bottom end.

" In a second modification the screw-shaped flange is continued " from the surface flange down almost to the bottom point of the " spindle.

" In a third modification, more particularly suitable for tele- " graph posts, the screw-shaped flange is formed upon the lower " part of a tubular centre which is open at the bottom," and is tapered, having the larger part uppermost. " The foot of the " post may be made separately from the upper part." " The " improved post is fixed by simply screwing it into its place without " previously preparing the ground." " The post will be most " economically made of cast iron, and in making the mould for " casting it it is preferred to shape the part of the mould that " forms the screw-shaped flanges by screwing or tapping the " pattern into and out of the sand or mould material."

[Printed 4*d*. No Drawings.]

A.D. 1866, February 20.—N° 524.

WARWICK JOHN ALFRED. — " Improvements in railway " signals."

The object of this invention " is to indicate at any desired " place whether the light of a distant semaphore or other railway " signal is or is not burning." This purpose is effected by means of a metallic rod or tube, which, being expanded by the heat of the light when lighted, makes or breaks an electric circuit, in which an indicating instrument and a bell are included.

The Drawings show a semaphore lamp, to the frame of which, over the burner, is fixed a thin brass tube, or " expanding piece." The said expanding piece abuts against the short arm of a spring lever, and, when the lamp is alight, causes the extremity of the long arm of the lever to break contact with an adjustable contact screw; in this condition of the apparatus the pivoted armature of the indicating instrument is not opposite to the poles of the electro-magnet, and a screen, mounted on the armature axis, shows the signal " In." When the lamp goes out, the expanding piece contracts, causes the spring of the short arm of the lever to keep the said short arm against the end of the expanding piece, and thus to force the extremity of the long arm into contact with the contact screw; in the indicating instrument, the armature

places itself opposite to the poles of the electro-magnet, and causes the screen to show the signal "Out," at the same time ringing a bell by means of a hammer attached to the armature.

The spring lever may be dispensed with, and, if preferred, the circuit may be broken by contraction.

[Printed, 1s. 10d. Drawings.]

A.D. 1866, February 22.—N° 549.

BRIGHT, HENRY.—"Improvements in electric clocks."

"The rod of the pendulum at its upper end is suspended in the "usual manner, and at its lower end it carries a reel or bobbin "wound with insulated wire in the ordinary manner. There are "also two fixed permanent magnets with their like poles opposite "to each other, over which the hollow bobbin or reel passes in the "swing of the pendulum." "Above the pendulum there is a "break or contact maker which is capable of swinging freely on "its own axis, which is in the same plane with but above the "point of suspension of the pendulum. The break consists of a "narrow strip of copper or other metal which is bent in the centre "of its length into two similar limbs, and the two limbs are again "bent towards each other, so that their lower ends are opposite "each other and only at a short distance apart. The lower ends "of the two limbs are on the two sides of the rod of the pendu-"lum, but at a short distance when the pendulum hangs per-"pendicularly." The axis of the break is insulated, and, to the upper part of the bend in the copper strip, "is applied a "screw or stem which carries a counterbalance weight, the "position of which is capable of being adjusted." By this means the pendulum is made to drive the clock, through suitable gearing, as well as to make the requisite breaks and contacts. During each double oscillation a current is sent through the coil; if necessary, however, an impulse can be given both ways, by reversing the current at each vibration of the pendulum. Means of employing this arrangement to regulate other clocks are also set forth.

The contact maker is the chief feature of the invention.

[Printed, 8d. Drawing.]

A.D. 1866, February 23.—N° 556.

NUNN, WILLIAM, and BROWN, CHARLES WILLIAMS.—"Im-"provements in ships' binnacle lamps."

1st. "Lighting the compass card within the binnacle from "above by means of a lamp, the oil chamber of which is supported "on a double swivel or gimbling; this oil chamber is cylindrical "and elongated obliquely downwards, its internal circumference "being polished and reflecting, whereby the lighted wick which "is fixed at its upper level within it, throws its light downwards "upon the compass card."

2nd. "Employing a short cylindrical translucent card around "the external circumference of which the 'points' of the compass "are marked, and one space marked 'under sail on a wind.' "This card is made to revolve by means of a rack and pinions, "to the arbor of one of which a key is fitted designed to be kept "by the officer of the watch. This cylindrical card revolves "within the binnacle lamp placed in the binnacle, and is therefore "illuminated, and is made visible from the outside through a "space or hole in the front of the binnacle lamp sufficiently large "to admit of one or more 'points' of the compass being seen "through it; a projecting point at the top or bottom of the "opening serves as an indicator to which any particular 'point' "of the compass marked on the card can be brought by turning "the key, thus a compass course can be clearly given by the "officer of the watch." "This compass course is equally visible "by daylight; when no course is given the space marked 'under "'sail on a wind' should be shewn."

[Printed, 8d. Drawing.]

A.D. 1866, February 24.—N° 580. (* *)

WELCH, William.—(*Provisional Protection not allowed.*) "Manufacturing and applying argillaceous, calcareous, silecious, "and metal composition cements." The invention has for its object "the manufacture of liquid and plastic cement compositions, and "relates also to the method of applying the same for ornamental "and other uses. The cements are compounded from varied "geological stratas made subsidiary by mechanical and other "means, or from substances artificially compacted in lieu thereof. "The metallic or other substances thus produced are by the aid "of mineral acids, liquids, and salts agglutinated into a plastic or "fluid consistency according to the purposes for which it is "intended, and may be applied in the usual forms of ordinary "paints or cements. The properties of the components are "permanent and literally indestructable and firmly adhering

"to metals, stone, wood, or other surfaces without being dis-" "placed by concussive or vibratory action (as in the case with" "ordinary cements when applied to non-absorbent bodies). The" "compositions are intended to be used for general, building, and" "other purposes, as also for imitations of stones, metals, &c., and" "for plastic ornamental purposes, also for the coating and pre-" "servation of iron and other substances exposed to marine uses," "whereby a waterproof insulatory protective surface is obtained" "and where necessary coated with a granulated or fluid metallic" "compound (pure or mixed), whereby a system of galvanism" "active, passive, or otherwise is produced for antifouling or" "other purposes."

[Printed, 4d. No Drawings.]

A.D. 1866, February 24.—N° 582.

PULVERMACHER, Isac Louis.—"Improvements in means" "and apparatus for producing and applying galvanic currents."

1st. "Making chain batteries," so that the zinc or magnesium may "be securely held, and when consumed readily replaced." Each link "is formed from a copper plate," a portion of which "forms a kind of buckle;" the other portion is slotted, and is bent round into the form of a tube. Into each copper tube is introduced a zinc tube, with an intervening fabric fixed on to the said zinc tube; thread may be used instead of the fabric. The buckle of one link is introduced into the tube of the next link.

2nd. "Connecting elements of voltaic chains formed of" "spirals" [helices?], "or of cylinders by means of a copper wire" "bent into a rectangular form," the ends of the wires being hooked in order to attach them to each other.

3rd. "Securing inoxidizable voltaic contact" between the links, by means of a thin flat copper wire soldered at its extremities.

4th. Making galvanic elements in the form of lockets, albums, and other articles; they are hinged in an insulated manner.

5th. "Making galvanic elements in the form of buttons and" "similar articles provided with a pin or brooch fastening."

6th. Making galvanic elements into a chain having links of certain flat forms, the buckle of one link receiving the strap or narrow end of the next link.

7th. Making "galvanising frictional brushes" by means of tapes rolled in a spiral, and fastening therein a thin broad

platinum strip. Bundles of wires may be used instead of a strip.

8th. "Making and breaking electric currents by means of "tongues actuated by the admission and expulsion of air."

[Printed, 1s. 6d. Drawing.]

A.D. 1866, March 5.—N° 662.

CREAN, John, and BARR, Charles Joseph.—(*Provisional Protection only.*) "An improved fire-alarm."

According to this invention "the heat of the fire is employed "to set in action the elements or parts of a galvanic battery, and "thereby form a current by which the alarm is set in action. "The heat generated by the fire causes a fusible composition to "melt, thereby opening a passage between two chambers, and "bringing into contact the elements or parts of a galvanic "battery, thus generating an electric current which is conveyed "through wires to the place where the alarm is to be given. The "said alarm is given by causing the electric current thus gene-"rated to ring a bell by the ordinary known means, or by igni-"ting, by means of a wire heated by the electric current, a fuse "and a detonating tube" similar to that described in No. 1998 (A.D. 1865). Two tubes of glass are affixed upon a suitable tablet. In one of the said tubes, the plates of a galvanic battery are placed, and there are conducting wires therefrom; the exciting liquid occupies the other tube. "Between these said tubes con-"taining the battery plates and liquid, we place a small metal "tube for the purpose of communicating with the interiors of the "said tubes. In the communicating tube we place a composition "that will melt by the heat of the place on fire. In the other "end of the tube containing the liquid we place a small tube "containing some of the aforesaid fusible composition for the "purpose of allowing the liquid to run into the bottom tube "more rapidly when the action takes place. The electric current "thus generated gives the alarm in the manner before described."

[Printed, 4d. No Drawings.]

A.D. 1866, March 5.—N° 670.

LECLANCHÉ, George Lionel.—"Improvements in piles for "generating electricity."

"I place in the bottom of a bottle or jar, having a large mouth, "a plate of copper or any other metal, or even any other electro-

"phil substance, such, for instance, as graphite, or any other "carbon or good conductor of electricity, to which I attach a "wire to be used as one of the poles. I cover this plate with "carbonate of copper reduced to a powder; and I then fill the "bottle or jar nearly up to its mouth with sand or pulverised "sandstone, in the middle of which I place the zinc provided "with a copper wire, to be used as the negative pole; I then "moisten the whole with a liquid containing a salt in solution "capable by its decomposition of rendering soluble the salt "employed.

"In the case above mentioned (carbonate of copper) I moisten "the whole with water containing about twenty per cent. of "hydrochlorate of ammonia; the apparatus may then be her-"metically closed. It is of course understood that the two wires "must be allowed to pass through the mouth of the bottle."

Other insoluble, or but slightly soluble, salts of copper may be used in this battery; they are to be "moistened with a liquid "containing a salt in solution which is capable by its decompo-"sition of rendering the said salts of copper soluble."

The following salts of copper give excellent results:—"The "chloride, sulphates, basic sulphates, oxychlorides, and even "oxide of copper."

[Printed, 6d. Drawing.]

A.D. 1866, March 9.—N° 717.

MOXON, Thomas Bewsher.—(*Provisional Protection only.*)
"Certain improvements in safes or similar depositories."

"My invention is designed for the purpose of rendering 'safes' "or other depositories for valuable articles more secure than "hitherto, and for giving an alarm at any place or distance from "the safe desired if an unlawful attempt should be made to open "the safe when locked or closed. The improvements consist in "arranging and confining within the interior of the safe or other "convenient place an electric battery, from one of the poles of "which an insulated wire is conducted to any convenient or desired "place. This wire is caused to take a winding or serpentine "course along and throughout the sides of the interior of the "safe, forming thereby a cage, which may be imbedded for "insulation in suitable cement or gutta percha. From the oppo-"site hole" [pole?] "of the battery another wire is conducted so

" as to form a connection with the aforesaid wire, so that when " the safe door is closed the electric current between the poles of " the battery is complete, and in such condition the current will " suspend a magnet arranged in any position or place upon the " conducting wire, but should the wire be severed or disconnected " and the electric current broken, the said magnet is no longer " held in suspension, but is caused to drop on to the end of a " lever, and by the weight of such magnet immediately sets in " motion an alarm, thereby giving notice that an attempt has " been made to open the safe; the interstices of the wire cage " within the interior of the safe are sufficiently small to pre- " clude the possibility of any instrument being inserted without " destroying the electric current."

[Printed, 4d. No Drawings.]

A.D. 1866, March 9.—N° 726.

BAKER, James.—(*Provisional Protection only.*) "Improve- " ments in magnetic engines."

Electro-magnets, fixed transversely to a wheel, rotate with it. The pole of a fixed electro-magnet is near to the poles of the moveable electro-magnets, similar poles being " opposite to each " other in the fixed and moveable electro-magnets." "At a " short distance from each fixed electro-magnet a powerful per- " manent magnet is to be placed, so that when the electric " current is passing through the rotating electro-magnets, opposite " poles will be as near as possible in contact without touching." By means of a commutator, composed of insulated metal channels to which " the electric wires are attached " and an " arm " to each rotating electro-magnet, the rotating electro-magnets are excited " as they come exactly opposite the fixed electro-magnets. " The action of the machine is then as follows:—The moment " the current is allowed to pass the fixed electro-magnet will " attract in succession the soft iron cores until they are opposite, " but at that moment the current will pass through each " successive helix, magnetise the iron core, oppose similar poles " to each other on the electro-magnets and opposite poles on the " rotating electro and fixed permanent magnet, and as a conse- " quence the former pair will repel each other, and the latter " attract each other until exactly opposite at that moment the " current will be broken in the rotating electro-magnet, and the

"reactionary current will for a moment reverse the poles of the "latter and give it an impulse from the permanent fixed magnet, "and so on in succession."

A thermo-electric battery may be used to excite this engine. "The thermo-magnetic engine can then be used either indepen-"dently or in connection with a steam engine."

[Printed, 4d. No Drawings.]

A.D. 1866, March 15.—N° 774. (* *)

ROBERTS, MARTYN JOHN. — (*Provisional protection only.*) "Improvements in protecting iron ships and other submerged "structures from corrosion and fouling." "On the iron bottom, "either painted or clean, I attach zinc or other metal which is "electro-positive to iron by solder, bolts, or screws, care being "taken that the zinc or other metal electro-positive to iron has a "clean metallic junction or communication with the iron." "I then coat the zinc or other electro-positive metal on the side "or face not in contact with the iron with paint or varnish, "which acts as a mechanical aid in preserving the zinc; or a "composition such as varnish may be used, which will also act "as an electric insulator or separator between the zinc and the "copper hereafter mentioned. Upon the zinc or other electro-"positive metal I fasten by wooden treenails or other means "which will not present a metallic surface on the exterior face of "the wood, wooden sheathing or planking diagonally or other-"wise, and of a sufficient thickness to secure the copper sheathing "nails without permitting the points of these nails to penetrate "to the zinc or other metal electro-positive to copper. Some-"times I secure the wooden planking by bolts having two "diameters, the smallest diameter being passed through the zinc "and iron and screwed tight by a nut inside the ship, while the "larger diameter passes through the planking, the shoulder at "the point which separates the diameters resting on the zinc. "The thickness of the planking must be greater than the length "of the larger diameter of the bolt, so that the head of the bolt "may be sunk some distance into the planking, and covered "with some suitable composition to insulate it from the copper. "Upon the wooden planking I fasten a copper sheathing in the "usual manner. Thus the iron ship is protected from corrosion "galvanically by the zinc or other electro-positive metal, and if "desired also mechanically by any paint on it. The zinc is pro-

" tected from undue corrosion by its own coat of oxide, and also " by the paint. The zinc is separated from the copper mechani- " cally by the wood, and electrically by any insulating paint, and " thus no galvanic pair is formed of the copper and zinc. The " zinc is therefore not unduly wasted, and the copper not being " electrically protected is corroded, so that marine animals and " plants do not adhere to it."

[Printed, 4d. No Drawings.]

A.D. 1866, March 24.—N° 870.

STIEFFEL, PHILIP.—(*Provisional Protection only.*) "An im- " proved fly for moderating or regulating the movements of " wheelwork."

This fly may be applied to a musical snuff box; it is a broad riband of tempered steel wound round a wooden cylinder, the fly having a projecting or partly turned-up end. "The cylinder is " fitted on an axle or spindle which runs through its centre. " The ends of the axle are supported by plates, and on the " upper or superior end thereof is an endless screw, into which " gears one of the wheels of the movement, with which the fly " is thus placed in connection." In some cases the inventor dispenses "with the use of the endless screw in the axle," and adopts "in lieu thereof a cog wheel or pulley to effect the object " for which the screw is used."

"The means above described are adaptable to apparatus for " telegraph printing, for clocks, lamps, or other purposes where " wheelwork is used without derangement of the wheelwork " usually employed." When found desirable to vary the pressure of the moderator or fly, the inventor encloses "the riband " in part in the cylinder, which for such purpose is made hollow, " having a slot cut in its periphery of the length of the breadth " of the riband forming the fly; by drawing out a part of the " reserve the resistance of the fly to the air or fluid (the fly " working in either) will be increased; retiring a part of the over- " plus into the cylinder will diminish its resistance."

[Printed, 4d. No Drawings.]

A.D. 1866, March 24.—N° 883.

MOSELEY, WALKER. — (*Provisional Protection only.*) "An " improved electrical indicator."

A bell or bells and numbered plates indicate the locality from which the signal is transmitted. The indicating plates can be concealed behind the bell; in this case a catch upon each plate rests upon the clapper, "the other end of the plate being sup-" ported by a swinging arm, one end of which is pivotted to the " board or frame." The clapper "is attached to the apparatus by " a spring, and is arranged in connection with an electro-magnet;" when the clapper begins to vibrate, upon the excitation of the electro-magnet, the indicating plate falls down and exhibits its number.

"Instead of the above-described arrangement, wherein a separate " bell is provided in connection with each indicating plate, the " apparatus need only have only one bell, which will act in com-" bination with a series of the said plates." The indicating plates are arranged "in regular order upon the board or frame " behind a suitable cover. The conducting wires are arranged so " that each one communicates with one of the indicating plates, " and all of the said wires communicate with the bell."

"In either of the above arrangements of the apparatus it is an " essential feature of my invention to secure all the parts of the " apparatus to a board or frame instead of attaching the said " parts separately to the wall or other portion of a building."

[Printed, *4d.* No Drawings.]

A.D. 1866, March 24.—N° 885.

MOSELEY, Walker. — (*Provisional Protecton only.*) "Im-" provements in galvanic batteries."

"The metallic plates, which are preferably of zinc or platinum, " are contained in suitable cells fixed or formed in a circular " gutta percha cup or basin which is placed in an inverted posi-" tion in a box or case of wood, porcelain, or other suitable " material, the said cup being provided with suitable stops or " connections for securing the ends of the conducting wires. An " expanding bag of prepared india-rubber is securely attached to " the mouth of the gutta percha cup or basin, and is preferably " of such a capacity as to contain, when expanded, the whole of " the exciting fluid at a level just below the lower edges of the " metallic plates. When this bag is squeezed or compressed the " said exciting fluid will be forced up into the gutta percha cup " or basin, and will completely cover the metallic plates. The " bottom of the expanding bag rests upon the end of a lever which

" is curved to suit the shape of the said bag; this lever is pivotted
" or jointed to one side of the outer box or case, its upper end
" extending upwards to the top of the gutta percha cup or basin,
" in which an orifice is formed to serve as an air vent; this
" orifice is provided with a valve capable of being opened and
" closed when required by the bent lever, the said lever having
" an arm extending upward outside the box provided with a knob
" or handle."

When the battery is to be used, the lever compresses the bag, and the air valve is opened.

[Printed, 4*d*. No Drawings.]

A.D. 1866, March 31.—N° 931.

READ, William (*a communication from William Henry Read*).—" Improvements in electro-magnetic power engines."

This invention consists in an " arrangement of electro-magnetic " power engines in which the poles of a series of rotating, horse-" shoe, permanent, or electro-magnets are made to pass between " the poles of one or more groups of fixed horse-shoe electro-" magnets, so combined with and acted upon by the current " breaker and changer as consecutively to attract the rota-" ting magnets to repel the same, and to be thrown out of " the circuit." A horizontal rotating disc carries a certain number of horseshoe permanent magnets " placed upon edge and " arranged radially at equal distances apart with their poles out-" wards;" the fixed horseshoe electro-magnets are arranged in groups; they are " in radial positions and upon edge," the poles of the rotating magnets being just able to pass between them.

The vertical spindle " carrying the rotating magnets imparts " motion by means of suitable gearing to a second spindle carry-" ing two insulated annular cups containing mercury," each of which receives one of the battery terminals; springs and rollers, revolving with the mercury cups, conduct the current to an annular conducting plate so connected with the coil terminals of the electro-magnets that the above-mentioned attraction, repulsion, and non-action may occur, at suitable times, in each of the groups simultaneously.

A current reverser is used, in which two screw cups, insulated from each other and mounted upon a centre, receive the battery

It is preferred to make use of two insulated wires and of the rails as a third wire. The two insulated wires are connected together on the engine through a galvanometer and a single-stroke electric bell; their two other extremities terminate in the guard's van at the end of the train. In each compartment, wires in connection with a transmitting apparatus, communicate with the insulated wires and with the rails respectively. Batteries are placed in each guard's van; the guards' vans have also switch keys to transmit signals to the engine driver. When a passenger pulls the lever of a transmitting apparatus, the lever is retained by a spring bolt, a wire is cut, and all the van bells ring. The guard then uses his discretion as to whether he shall signal to the engine driver to stop instantly or at the next station, a permanent signal continuing until the stoppage of the train.

If desired an explosion signal may be used, gunpowder cartridges being fired by the striking of a percussion cap.

A local circuit closer "acts on the principle of demagnetizing "and reversing the polarity of a piece of soft iron rendered "magnetic by induction from a permanent magnet;" this local circuit closer is employed in the continuous ringing bell in the guard's van.

The permanent magnetism of electro-magnets is neutralized by means of an opposing current to the main current, which is constantly kept passing through a set of resistance coils and a "secondary wire" for that purpose.

Galvanic batteries are constructed in which sawdust soaked in the requisite solutions is imbedded in the resinous cement which lines the cells.

The battery on the engine may be dispensed with by means of an apparatus which only brings into action a sufficient amount of electric power to ring the bell when a passenger pulls the lever of the transmitting key.

Many details are set forth in this Specification.

[Printed, 1*s*. Drawing.]

A.D. 1866, April 13.—N° 1050.

BRITTAN, THOMAS.—"Improvements in telegraphic signalling "apparatus."

This invention relates to those electric bells in which the hammer is released by a detent that is operated by an electro-magnet,

and in which clockwork supplies the force with which the hammer strikes the bell.

The invention consists in "adapting to the weight or spring "barrel of the clockwork of a signalling apparatus an arrange-"ment for winding up the same by the action of sending the "return signals." The shaft of the spring barrel or weight barrel of the clockwork carries "a ratchet wheel, which is actuated "by a click at the end of the hand lever, whereby the attendant "makes and breaks the electric circuit in order to magnetise the "induced magnets within the coils of the distant apparatus, as in "all magnetic apparatus of this kind." On depressing the hand lever to make the return signal, its opposite end slightly rotates the ratchet wheel and winds up the clockwork.

"In order to prevent the clockwork from being wound up too "much the ratchet is provided with a friction arrangement." One mode of effecting this object is by means of a friction plate, which is fixed on the axle of the barrel and bears against the outer side of the ratchet wheel; the friction plate yields when the clockwork is fully wound up. According to another mode, a strong friction spring is placed inside the barrel, and its inner end is rivetted to the ordinary convolute spring; the friction of the strong spring against the inside of the barrel carries the barrel round, but slips when the over-winding commences.

[Printed, 8d. Drawing.]

A.D. 1866, April 16.—N° 1068.

KAULBACH, Reinhold Edward.—"The improvement of the "means of and apparatus for laying submarine electrical tele-"graphic wires, lines, cables, or other contrivances of a like "sort."

"A permanent way or bridge" is formed beneath the surface of the ocean, "the said permanent way or bridge to consist of a "series of vessels or condensers stationed along the whole of the "intended line of communication at distances to be determined "according to circumstances or requirement, sunk to an average "depth of seventeen fathoms, and firmly moored to the bed of the "sea."

The condensers are air-tight and can resist a pressure of eight or ten atmospheres. Each condenser is traversed by a longitudinal tube, that has fittings by means of which the requisite number of cables can be secured within the said tube; the other principal

fittings are an air cock, two vertical tubes (the lower extremity of each of which descend nearly to the bottom of the condenser), a valve box at the upper extremity of each of the said tubes (containing a short vertical tube closed by a valve), and a valve lever that operates all the valves. The air cock being open, water is let into the vessel to the requisite amount, the valves are closed, and air is forced into the said vessel until the required pressure is attained; the vessel sinks, and a weight attached to the mooring chains is deposited at the bottom of the sea. To raise the condenser, the lever chain is pulled until the valve is opened, when the expulsion of the water causes the apparatus to rise.

By means of small insulated wires, branching off from the main wires, and secured to the buoy that shows the place of a condenser, "messages may be sent from mid-ocean."

[Printed, 2s. Drawings.]

A.D. 1866, April 17.—N° 1079.

BROOMAN, Clinton Edgcumbe (*a communication from Louis Bataille*).—"Improvements in crushing, separating, and "washing ore and other substances, and in apparatus employed "therein."

The apparatus described in this Specification are:—1. A "differential crushing apparatus." 2. A "graduated separating "apparatus." 3. A "mechanical washing apparatus."

Lastly, this invention consists in the employment of electricity "for the separation of materials." "For instance, take an ore "containing gold, silver, metallic iron, or magnetic oxide, quartz, "calcareous matter, and clay. These matters after having been "crushed and sifted are placed in the washing vessel and fall "therefrom on to the washing platform, as before explained. "After the work has been carried on sufficiently long, the mate-"rials become deposited in the following order:—Gold and silver "at the bottom covered by the iron, then come the quartz, ser-"pentine calcareous matter, and clay. If now the platform be "magnetized by an electric current the layer of iron, owing to "the power of magnetization is attracted to the platform; the "gold and silver are thus securely held while the other materials "above the iron are free, and may be easily discharged without "any portion of the metals being lost. What I have described "for gold and silver applies to other metals, lead and copper, "provided that the specific gravity of the mineral to be treated

"is greater than that of iron. If the materials do not contain "iron it may be mixed with them, and if the density of one or "more matters to be preserved is near that of iron a body of "suitable specific gravity may be coated by the galvano-plastic "process with a layer of iron and mixed with the materials."

[Printed, 1s. 2d. Drawings.]

A.D. 1866, April 21.—N° 1135.

BAKER, JAMES.—(*Provisional Protection only.*) "Improve-"ments in thermo-electric batteries."

"A cylindrical stove of any required dimensions is surrounded "in a stella form by pairs of thermo-electric metals placed in cir-"cular layers one above the other, and as close to each other as "possible consistent with insulation; the inner ends of the pairs "in each circular layer to approach near to the cylindrical stove, "but not to touch it. At a short distance from these inner ex-"tremities the thermo-electric metals which form the pairs are to "be cemented together with an insulating and fire-proof material, "forming, as it were, a second cylinder exterior to the cylindrical "stove; exterior to this again, at any required distance, is to be "another similar cylinder, and the interval between the two is to "be filled up with tile dust or any insulating material which is "also a good non-conductor of heat. Near the exterior ends of "the pairs is to be fitted another cylinder of the same kind. The "ends formed by the inner insulating cylinder and the cylindrical "stove are to be closed, but the upper end is to be provided with "an apparatus to admit air at will; the ends of the remaining "exterior cylinders to be opened or closed as may be found con-"venient; a circular trough to be fixed on the upper end of the "exterior cylinder, provided with drop tubes for dropping water "(mixed with common spirit if necessary) upon the exterior ends "of the thermo-electric pairs, and thus to cool them by evapora-"tion."

"By this arrangement" "increased intensity will be obtained "by means of induction, as in the case of an induction coil."

[Printed, 4d. No Drawings.]

A.D. 1866, April 27.—N° 1186.

NELSON, MORTIMER.—"New or improved machinery for "making impressions or forming moulds for stereotype or electro-"type plates."

This invention consists in arranging type radially round the periphery of a rotating wheel; the type are operated individually to impress their characters upon paper, clay, or wax by a series of key levers; a roller, with pins or perforations (helically arranged), stops the (otherwise) constantly-rotating type wheel, according to the key which is depressed.

The invention also consists in the mode of regulating the movement of the platen that carries the impressed surface, so as to insure the successive impressions of the type being produced in proper positions. When the type wheel is brought to the proper position by the depression of a key, self-acting mechanism, at one end of the roller axle, actuates a lever which moves the surface to be impressed, and which works another lever by which the type is pressed down a definite distance.

The bed of the machine is placed upon a carriage, which is acted upon by a feed wheel, a rack being fixed below the said bed. A "spacing block" defines the extent of motion of the platen, according to the width of the letter, the above-mentioned lever of the self-acting mechanism working a limiting lever, which limits the extent of motion by its connection with the feed wheel as well as with the spacing block.

An elastic ring holds the type in the type wheel, but permits the type acted upon to be forced out.

A stop applied to the above-mentioned limiting lever determines the depth of the impression of the type.

[Printed, 10d. Drawing.]

A.D. 1866, April 27.—N° 1195.

THOMPSON, Jacob Baynes.—(*Provisional Protection only.*)
"Improvements in protecting iron ships from fouling and "corrosion."

Copper will protect iron ships from fouling and from corrosion "if it be put on water-tight, so that no part of the iron hull "which is submerged shall come in contact with the water. To "attain this end I cover the hull of an iron ship with a scaled "sheathing of copper-coated iron plates embedded on elastic "felt, which is thoroughly permeated by a mixture of pitch and "tar and firmly riveted to the skin of the ship to a little above "the load line. The skin to be drilled partially through and "tapped. The rivets to be made of pieces of drawn copper rod "screwed at one end to fit the tapped holes; then the felt, after

"being properly punched, is slipped over the rivets and bedded "down, and then the plates over that and firmly riveted. The "plates must be of sufficient strength to bed close to the ship on "the felt without springing or buckling. These plates I cover "first with lead by heat on both sides, and then with copper by "electrolysis." "The coating of lead is to protect the plates in "case the copper should be accidentally scrubbed off, lead being "negative to copper in sea water."

The leaded iron plates are dipped into a solution of cyanide of mercury, then coated with a thin deposit from a solution of cyanide of copper, and thoroughly washed, and finally coated with copper to the thickness required from a sulphate of copper solution. "Between these plates and the iron skin of the vessel "felted wool or other animal fibre saturated with pitch and tar "is introduced for bedding the plates upon, making a thoroughly "water-tight connection of the two surfaces, preventing the "iron skin of the ship from coming in contact with the water."

[Printed, 4d. No Drawings.]

A.D. 1866, April 28.—N° 1209.

PIGGOTT, WILLIAM PETER.—"Improvements in preventing "corrosion and fouling of iron ships."

To prevent corrosion of the internal and external portions of iron ships from the action of sea water, zinc, or other metal electro-positive to iron in sea water, is either attached directly to the iron surface of the ship or placed in electrical communication therewith; in all cases, the zinc is so situated "as to enable it to "be acted upon by the sea water."

To prevent the fouling of iron ships, the ship is placed, by the aid of battery currents, in one electrical condition, "and the "water in which it floats in the opposite electrical condition by "the aid of conductors from either end of the battery leading "into the water, the iron of the ship being at the same time "connected with the opposite pole of the battery, the relative "electrical conditions being reserved" [reversed?] "or changed "from time to time at pleasure." In carrying out this part of the invention, strips of zinc are placed in the sea, respectively at the stem and stern of the vessel and insulated from the iron of the ship. Two separate electric currents are caused to flow in

opposite directions "from the zinc at one end of the ship through "the sea water to the iron at the other end;" this arrangement also negatives the "polar influence" of the ship upon the compass. The battery described in No. 2213 (A.D. 1865), may be used; or the sea may have access to a porous chamber that contains a zinc or carbon plate, and thus furnish the electric current and the means of changing the direction of the same, the iron of the ship being the other battery element.

[Printed, 4*d*. No Drawings.]

A.D. 1866, April 30.—Nº 1218.

JENKIN, FLEEMING.—"Improvements in apparatus for winding in telegraphic cables, applicable also when winding in "other ropes or chains."

"The connection between the engine and the drum is made as "follows:—A toothed wheel driven direct by the engine gears into "a pinion which is carried by a break" [brake?] "drum, and I "prefer to use the break known as Appold's break for this purpose. This pinion gears into a toothed wheel rigidly connected "with the picking-up drum; then until the strain on the cable "reaches the amount to which the break is set the pinion and "break drum are stationary, so that the picking up proceeds in "the usual manner, but if this strain is reached then the break "drum forming as it were a fulcrum yields, and the pinion upon "it moves round the wheel on the picking-up drum instead of "driving it; the picking-up drum then stands still. If the strain "on the cable is still further increased the picking-up drum is "pulled back; the break then restrains both the cable and the "engine, which, however, continues to run."

According to one arrangement which is shown in the *Drawings*, a pinion on the brake drum gears, on the one hand, into a spur wheel on the engine shaft, and, on the other hand, into an internal toothed wheel on the picking-up drum.

According to another arrangement, also described and shown, wheels, mounted in bearings on the brake drum, gear with toothed pinion on the engine shaft, and with a toothed wheel keyed upon the picking up drum through intermediate pinions.

In each case the brake drum and the picking-up drum turn freely, and the wheel or pinion on the engine shaft is keyed thereon.

[Printed, 1*s*. 2*d*. Drawings.]

A.D. 1866, May 1.—N° 1226.

DAVIES, GEORGE (*a communication from David Brooks*).—" Im-" provements in insulators for telegraph wires."

This invention obviates the leakage of electric force from the collection of water on the insulators.

A double hook or wire holder is cemented into a hollow glass cylinder by means of molten sulphur; "after this a strip of paper " made in the form of a cylinder is cemented to the upper edge " of the glass;" the glass, with its wire holder, is now ready for attachment to the outer cylindrical hollow casing of cast iron, which has a projection whereby it is attached to the telegraph post. A suitable quantity of molten sulphur is poured into the heated outer casing, and the glass block together with its paper cylinder are deposited therein. The glass cylinder being shorter than the casing, and, "as the paper extends to the upper edge of " the casing there will necessarily be a body of sulphur between " the casing and the paper; the sulphur and paper at the upper " edge of the casing are then trimmed off, after which, while the " insulator is still in an inverted position, the space above the " glass within the paper cylinder is filled with melted paraffine; " the insulator is then turned upside down, and the greater " portion of the melted paraffine is poured out, the remainder " adhering to the paper and to the upper edge of the casing and " sulphur, for care should be taken that the coating of paraffine " extends over the edge of the casing. When the covering of " paraffine has become congealed it is covered with a varnish com-" posed of bees'-wax, rosin, and paraffine, when the insulator is " complete and ready for being attached to the pole."

[Printed, 6*d*. Drawing.]

A.D. 1866, May 8.—N° 1315.

WOODBURY, WALTER BENTLEY.—(*Provisional Protection only.*) "Improvements in producing designs upon wood and " other materials by the aid of photography."

A metal reverse is taken from a bichromated gelatine mould, either by pressure or by the electrotype process, see No. 2338 (A.D. 1864). In this metal reverse, the highest parts represent the lights, and the deepest recesses the shades of the picture; an electrotype from this reverse is therefore a fac-simile of the gelatine mould. The latter electrotype is allowed to attain con-

siderable thickness, so that it may be heated to a dull red heat and pressed on to the surface of a piece of truly planed sycamore or other suitable wood. A picture is the result, "wherein the "shades are represented by the different amount of burning or "scorching which the wood undergoes."

"Instead of wood other materials may be used, such as velvet, "ivory, cardboard, paper, or other substance capable of being "blackened by heat, and the effect is not necessarily produced by "scorching, as the same effect will be obtained if the wood, "paper, or other material is prepared by any well-known chemical "substance having the property of being blackened or darkened "by the application of heat."

[Printed, 4d. No Drawings.]

A.D. 1866, May 10.—N° 1349. (* *)

NICOLL, DONALD.—"Improvements in the means of and apparatus for preserving animal and vegetable substances from "decomposition or decay, and for the conveyance and transport "of the same." These are, "the employment of tanks, vessels, "or carriages rendered air-tight, but in such manner that their "contents can be communicated with from the exterior without "admitting atmospheric air," also "the excitement, ignition, or "bringing into operation by electric or other percussive action "after blending or admixture" of any "known chemical ingre-"dients capable of producing gases tending to preserve animal or "vegetable substances" contained in the vessels. There are placed in the vessels "certain preservative agents caused by a "combination or action" "of the sulphuret, sulphide, sulphite, "and hyposulphite of potassa, soda, lime, or alumina, alkalines, "nitrites, carbon, the protoxide or carbonate of iron, or pro-"tosulphuret of iron, sulphuric acid, or other chemical ingre-"dients" known to produce gases capable of preserving food, and in the quantity required. In some cases the vessel has "a "perforated false bottom, and also a false or perforated top con-"taining a coil of copper wire in contact with any of the above "chemical agents, when by means of a wire brought outside the "tank, vessel, or carriage to a galvanic battery" is excited "the "production, ignition, or evolution of the needful preservative "gases, and the absorbtion or neutralization of others, the animal "or vegetable substances are thus enabled to be conveyed to

"great distances without risk of decomposition." The chlorides may also be used "by reason of their disinfectant properties." Also "hydrated nitrates of soda, lime, and potash." In such cases the dry nitrate or salt, "by preference in combination with "powdered wood charcoal or animal charcoal," would be scattered on the floor; the moisture and deleterious gases are absorbed by the mixture, which becomes "deliquescent and removable by "opening valves" in the floor.

[Printed, 4d. No Drawings.]

A.D. 1866, May 14.—N° 1376.

JOHNSON, John Henry (*a communication from Charles Dion*).—"Improvements in self-acting fire-alarms."

This invention relates to certain improvements upon the alarms described in No. 1223 (A.D. 1865).

"A straight compound metal spring composed of steel and "copper in about equal proportions, or of steel and zinc, or copper "and zinc, or an expanding and contracting wire (composed by "preference of German silver)" is substituted for the spiral compound spring described in No. 1223 (A.D. 1865); also the straight compound spring or metal wire is adapted to several different arrangements.

The first five modifications depend for their action upon a weight which is allowed to fall when the heat raises the temperature of the spring or wire to a certain degree, thereby expanding the said spring or wire and releasing the weight.

In the sixth modification, according to the Provisional Specification, the release of a weighted tipping lever (by means of a second index hand worked by levers that are set in motion by the expanding of the spring or wire) "establishes an electrical "circuit, which may be made to give an alarm in various ways, "as is well known." According to the Final Specification, the second index hand "may be made to connect with the positive "pole of a battery, and the index hand with the negative pole, "and thus form an electrical current and so communicate the "alarm."

[Printed, 10d. Drawing.]

A.D. 1866, May 16.—No. 1387.

GISBORNE, John Sacheverell.—"Improvements in and "connected with thief and fireproof safes."

Whenever any surreptitious interference with any such safe takes place, the said interference causes an electric signal to convey the knowledge of the fact to the person in charge of the safe.

"I construct the walls or other principal portions of a safe, or "the door or more exposed portion or portions only, or the lock, "bolt, bar, or other fastening, in two portions, say, inner and "outer, and separate or insulate these the one from the other by "any non-conductor of electricity. To the said separated por- "tions I connect wires from a galvanic battery or magneto- "electric generator of electricity placed in the safe or other secure "position. When so connected the electric circuit is not com- "plete; so soon, however, as the parts are brought into com- "munication or contact by a key or 'picker' passed into the lock, "a drill forced through the walls or other part, or by other means, "the electric circuit will be established, and at this instant a "signal, say, the ringing of a bell, will be given either in or at "the safe, or at any desired distance therefrom." The said inter- ference may break the circuit instead of establish it, and thus convey a signal; but, for practical working, that arrangement is preferred "in which the circuit is not completed or made when "the safe is closed."

To show the time of opening a safe fitted as above, the conducting wires are connected "to the well-known registering "apparatus consisting of clockwork, revolving cylinder, spaced "web of paper and pencil;" when the circuit is completed or broken the pencil makes an indelible mark.

[Printed, 8*d*. Drawing.]

A.D. 1866, May 24.—N° 1456.

WESTHEAD, ALBERT.—(*Provisional Protection not allowed.*)

"Improvements in apparatus employed in laying electric tele- "graph cables."

"In order to prevent the loss of an electric telegraph cable in "the event of its breaking when being paid out from a ship or "vessel apparatus is employed as hereafter explained through "which the cable passes freely whilst it is unbroken, but imme- "diately on its breaking wedges or friction surfaces carried by the "apparatus come into action and hold the cable before the broken "end arrives at the apparatus." "The apparatus is connected

"by a wire rope to the vessel from which the electric telegraph
"cable is being paid out and is drawn through the water at a
"distance from such vessel. On the interior of the apparatus
"are wedges or friction surfaces which whilst the telegraph cable
"is unbroken are held out of action by suitable stops or catches,
"but are arranged to be released by electrical means, and the
"arrangement is such that so soon as the telegraph cable is
"broken the wedges or holding surfaces are released and per-
"mitted or caused to come into action. An electric circuit is
"arranged between the apparatus and the vessel from which the
"telegraph cable is being paid out, and such circuit may be
"caused to release or bring into action the wedges or friction
"surfaces either on the making or breaking of the circuit, and it
"is preferred that the completing or the breaking of the electric
"circuit should depend on the telegraph cable itself, so that a
"fracture of the cable may be the instantaneous means of releas-
"ing or moving the wedges or friction apparatus in the apparatus
"above described."

[Printed, 4*d*. No Drawings.]

A.D. 1866, May 26.—N° 1470.

WEATHERDON, Baldwin Fulford (*a communication from Joseph Jean Marie Durand and Celestin Pichoin*).—"Improvements
"in gas pyrometers, which may also be employed as thermo-
"meters."

"This invention has for its object the employment of the varia-
"tions of volume developed in gaseous or other bodies resulting
"from the various temperatures of the matter in which the said
"body is placed, whereby physical and mechanical effects are
"produced calculated to maintain an equal temperature in the
"said matter, and consists of a mercury thermometer, gas pyro-
"meter, or otherwise, having two branches or tubes springing
"vertically from the bulb, in each of which said tubes platinum
"wires surmounted with silk, thread, or other insulating matter
"are so arranged in connection with electric piles and magnetic
"coils moving in conjunction with supply and discharge water
"taps, valves, air passages, or otherwise, as to admit of the said
"regulation being uniformly and accurately maintained."

Besides the above apparatus, the Drawing shows a counter-balanced float in the discharge water tank, the cord from the float passing round a drum in connection with wheel and axle gear that opens or shuts the damper or valve in the heat flue.

The bulb of the mercurial thermometer is placed in the heated matter to be regulated. When the mercury ascends to a determined point an electric circuit is completed by means of adjustable platinum wires in the said thermometer; electro-magnets (through the intervention of levers) actuate the supply and discharge valves, the former being in an upper tank. The wheel and axle gear are thus made to act upon the damper, the electric current ceases and the heat is maintained at a given value.

Nitrogen gas, in a closed platinum vessel, is also employed to bring the mercury in contact with the said platinum wires.

Clockwork or alarums may be employed in connection with the above described system.

[Printed, 8*d*. Drawing.]

A.D. 1866, May 29.—N° 1503.

NEWTON, WILLIAM EDWARD (*a communication from Nathan Bloch*).—(*Provisional Protection only*). "An improved mode of "connecting metallic wires."

"This invention relates to a novel mode of connecting wires. "It may be advantageously employed for uniting wires of any "thickness, whatever may be the purpose for which they are "intended to be employed, for instance for wire fencing, tele-"graphic wires, supports for plants, or other purposes where "the ends of wires may be required to be connected. For this "purpose two half round pieces of metal of a double tapering "form are employed which are made hollow inside for the recep-"tion of the wire, and are screwed at their ends for the reception "of screw nuts. One of these half round pieces is provided at "its middle with an oblong slot for the reception of the turned-"up ends of the wires. When the junction of the wires is "required to be effected their ends are bent at right angles to the "length of wire, and being brought together are passed through "the oblong slot in one of the half round sockets, the other half "round piece of the socket is then applied at the other side of "the wire and the screw nuts are slipped on and screwed up "tight, by which means the wires are held firmly in position."

[Printed, 4*d*. No Drawings.]

A.D. 1866, May 29.—N° 1504.

BOWDOIN, CHRISTINE TEMPLE (*a communication from Gaetano Bonelli*).—(*Provisional Protection only*.) "Improvements in "telegraphic printing apparatus."

At the transmitting station, type is traversed under a wheel with five equidistant arms that are in different planes. A similar wheel at the receiving station, having rotary motion synchronous with the wheel at the transmitting station, impresses the form of the type on chemically-prepared paper; the composed message and the chemically-prepared paper travel at the same speed.

"The passage of a current affecting an electro-magnet at each " station releases the two wheels, which start and move together. " As the five arms at the transmitting station severally come in " contact with their respective parts of the types as the composed " message is traversed under the wheel they will each transmit a " current as they touch the relief of the characters, and these " currents passing from the arms of the other wheel and through " the prepared paper before mentioned to the earth will severally " leave a dark coloured mark. Thus the tops of the letters are " all marked first, then the part immediately under that, then the " centre, and lastly the bottoms of the letters; the five points " need not necessarily be fixed to the arms of a wheel, but may " be arranged in any manner which will enable them to pass one " after another over the type in lines one above another."

[Printed, *4d.* No Drawings.]

A.D. 1866, May 30.—N° 1510.

HAMMERSLEY, WILLIAM RALPH. — (*Provisional Protection only.*) "Improvements in fluid compasses."

This invention consists "in the application of an elastic box or " chamber within the bowl or vessel containing the liquid en- " veloping the compass, whereby to maintain an equal pressure of " the fluid whatever may be the temperature to which it is sub- " ject." A chamber is formed "of two corrugated discs of metal " connected by a rim which forms a circular box;" the said box is disposed "in the body of fluid containing the compass, which " is introduced under sufficient pressure to exclude all air, the " bowl containing such fluid being hermetically sealed. A passage " of communication is established between the interior of the " elastic box and the external atmosphere. By the expansion of " the fluid from heat the box is caused to collapse slightly and " express a little of the air contained, while on the contraction of " the fluid the elastic box or case again expands, air entering the " said box and so permitting and ensuring its free action."

"Instead of arranging the air to enter the elastic box as before "described I sometimes arrange the air to take effect on the "exterior of the said elastic case and the fluid to enter therein; "for this purpose I form a compartment in the compass bowl or "vessel separated by a suitable partition, into which compart-"ment the external air has free egress and ingress; I dispose the "elastic box in this air compartment and establish a communica-"tion between it and the fluid chamber by a channel connecting "and supporting the elastic box at the centre of one of the "discs;" the elastic box receives more fluid at the increase of temperature; "on its contracting from cold the fluid again "returns into the fluid chamber."

[Printed 4*d*. No Drawings.]

A.D. 1866, May 31.—N° 1521.

JOHNSON, JOHN HENRY (*a communication from Jean Joseph Etienne Lenoir*).—"Improvements in the transmission of electric "telegraph despatches and in the apparatus employed therein."

Fac-similes of written messages are produced at the receiving station, by a mechanical operation, in transfer ink.

Two synchronously-revolving cylinders are employed, one at the sending, the other at the receiving station. The sending cylinder is covered with a sheet of metallised paper, upon which the message is written in non-conducting ink. On the surface of the metallised paper there rests a conductor, which establishes a circuit to the receiving station, unless it comes into contact with the non-conducting writing. In both instruments (the sending and receiving) a screw, geared to the cylinder, moves the conductor, or the tracer, laterally. The receiving cylinder is covered with a sheet of paper, over which a sheet of transfer paper is placed; a spring tracing point presses on the paper whenever released by the electro-magnet that is actuated by the currents from the sending machine, and thus gives a fac-simile of the writing. The electro-magnet that acts upon the tracer lever travels with it along the screw.

According to one plan for ensuring synchronism in the rotation of the said cylinders, a wheel commutator, or interruptor, at the sending station, has its rotation regulated by wings, and sends currents accordingly to an electro-magnet at the receiving station; before the poles of the said electro-magnet a set of radiating soft-iron arms rotate, wings also being connected with the axis of the

said arms. According to another plan, a conical pendulum may be used (instead of wings) to produce the said synchronism, and this whether the aid of electricity is called in for the purpose or not.

Secret despatches, a spark preventer, and diminished or increased size of writing, are also treated of.

[Printed, 1*s*. 6*d*. Drawings.]

A.D. 1866, June 7.—N° 1569. (* *)

TONGUE, JOHN GARRETT (*a communication from Maltby Kingston Pelletreau and Ellicott David Averell*).—" Improvements " in electro-magnetic striking attachments for paper-ruling " machines." The rollers, apron or endless cloth, feed board, ink fountain, and rocking pen bar, are constructed and arranged in the ordinary manner. To the " rock shaft " of the pen bar a lever is secured, having attached to its rear end the armature of an electro-magnet which is fastened upon one side of the frame at one extremity, the other being connected thereto by a spring. The spring exerts a constant tendency to lift the armature and pull the pen bar in a direction to raise the pen points, but is " not " strong enough to overcome the attraction of the magnet upon " the armature when the electric circuit through the magnet is " closed." On one side of the frame stand two upright metal posts, which must be insulated if the frame be not of a non-conducting material. Two horizontal arms of iron are inserted through holes in the posts and secured therein by set screws, and two metal rods are inserted through holes in the arms and similarly secured. Each rod is fitted at its lower end with a metal foot piece carrying a grooved roller of hard non-conducting material, and is adjustable forward and backward by a set screw in front and behind; the rollers rotate upon the apron or upon the sheets of paper. To the front foot piece is attached a lever (but insulated from it) which vibrates in the direction of the apron and paper, and serves as a " circuit break " by the insertion of a piece of non-conducting material into a recess in the front side of its " hub." The vibration of the lever brings this piece into and out of contact with the point of a light spring, " which is so " attached to the foot piece as always to press lightly on the " hub." The lower arm of the lever has fixed to it a light

finger which works in the groove of the roller, and whose extremity comes in contact with the apron or paper. A stop pin of insulating material is secured in the foot piece behind the upper arm of the lever; this arm is connected by a metal rod with a lever "of the second order" suspended by a pin from the other foot piece. This lever has also a finger working in the groove of the other roller; the pin is not insulated from the foot piece. One pole of a galvanic battery is connected by a wire with one pole of the magnet, the other pole of which is similarly connected with one post; the other pole of the battery is connected with the other post. The patentee then describes the parts affected, the action upon the pens, the process of ruling, and slight modifications of the adjustment of the foot pieces. "The "pens may be made to strike upon and rise from each sheet of "paper several times to rule two or more series of down lines" by providing the ruling machine with a corresponding number "of "circuit breaking apparatus" all connected with the same battery and magnet. In a modification of the machinery "when "only required to rule one set of down lines, the magnet is arranged "under the front end," and the armature "is attached "to the corresponding end" of the lever. A spring is joined to the rear end of the lever to raise the armature, "the action of the "magnet and spring upon the pen bar being the reverse" of that in the former machine. A stationary strip of thin sheet metal lies on top of the apron, extending at one end to a considerable distance beyond the pen points, at the other over the front of the bottom roller and united at this end by a wire to one pole of the battery. The apron passes freely under the strip. The other pole of the battery is connected by a wire to one pole of the magnet, the other pole of which is similarly connected to a metal post standing on the frame. Through this post, and secured by a set screw, is inserted a horizontal arm extending laterally as far as the strip. Through the end of the arm is inserted a metal rod, at whose extremity is a roller which bears on the sheet of paper and holds it down on the strip. At the same end of the rod is a finger adjusted by a set screw to bear upon the strip "when there "is no paper passing under it." The action of this machine and the process of ruling with it is explained in a detailed description.

[Printed, 1s. Drawing.]

A.D. 1866, June 15.—N° 1627.

HAMMERSLEY, WILLIAM RALPH.—"Improvements in fluid "compasses."

One improvement consists "in the application of an elastic box "or chamber within the bowl or vessel containing the liquid "enveloping the compass whereby to maintain an equal pressure "of the fluid whatever may be the temperature to which it is "subject." A chamber is formed "of two corrugated discs of "metal connected by a rim which forms a circular box;" the said box is disposed "in the body of the fluid containing the compass, "which is introduced under sufficient pressure to exclude all air, "the bowl containing such fluid being hermetically sealed. A "passage of communication is established between the interior of "the elastic box and the external atmosphere." According to another arrangement, the air takes effect upon the exterior of the elastic box and the fluid is allowed to enter therein.

"A second improvement in liquid compasses consists in the "application of elastic discs and boxes whereby to transmit "motion to lever apparatus for lifting the compass card off the "point." In one case, a pair of boxes are placed in the fluid, in a chamber adjacent to the compass bowl; "these boxes are united "at their centres and act in concert, the one expanding while the "other contracts."

A hand lever is applied to the end of a rod, which is connected to the uniting neck, and which passes through the chamber; the neck is also fitted with levers, so disposed in the fluid of the compass as to transmit the motion of the hand lever to the compass card. In a second case, the fluid is admitted to the boxes, and motion is given to the neck, by means of a screw nut, which encircles the chamber, and which acts on a rod stretched across its diameter.

[Printed, 1*s*. Drawing.]

A.D. 1866, June 16.—N° 1637.

LECLANCHÉ, GEORGE LIONEL.—(*Provisional Protection only.*) "Improvements in voltaic piles."

This invention refers to "piles" that generate electricity "by "means of peroxide of manganese moistened with a salt in solu- "tion which has no chemical action on peroxide of manganese,"

but which is capable, "by its electrical decomposition of rendering "soluble the sub-oxides of manganese which result from the "reduction effected by hydrogen." "Hydrochlorate of ammonia" is such a salt.

To a piece of graphite a wire is attached by means of a hole in the same and by running lead into the said hole, the extremity of the wire being first placed within it. The graphite is inserted in a porous diaphragm, and the whole is placed in a wide-mouthed jar; the porous diaphragm is then filled with "pulverised "peroxide of manganese, moistened as aforesaid," and the jar is filled half full with sand. A conducting wire is soldered to a piece of zinc, which is laid upon the sand; the jar is then filled up to the neck with sand, and a concentrated solution of "hydrochlo-"rate of ammonia" is poured therein, sufficient to damp its contents. Each conducting wire is coated with gutta percha. The conducting wires are passed through a cork, and the jar is corked hermetically. To facilitate the escape of gases from the jar, a small glass tube is inserted in the cork, which is secured by a coating of sealing-wax; the "protruding glass tube" is then broken off "level with the wax, and the same is covered" with a "disc of "india-rubber slit down the centre with a clean cut."

[Printed, 4d. No Drawings.]

A.D. 1866, June 19.—N° 1646.

BOLTON, Francis John.—"Improvements in the mode of "transmitting messages by the electric or magnetic telegraph."

"This invention relates to the employment of a written or "printed code of signals, and to the manner of arranging and "using such code when it is desired to communicate intelligence "by means of the electric or magnetic telegraph."

To send a message, the number or numbers, referring to the page and to the line in the code, is or are simply transmitted, the message or a part of it being found at the said page and line.

The numbers are respectively signified by dots and dashes; "the "necessity of mixing dots with dashes is obviated."

The five parts of the code are:—1. The alphabet and particular telegraphic signals (110 in number altogether), referred to by one or two figures. 2. The "spelling code," which spells any word by syllables, and provides for 1,000 signals; it is referred to by three figures. 3. Ordinary sentences and names, comprised in 10,000 signals and limited to four figures. 4. The "vocabulary

"and sentence code," alphabetically arranged in 100,000 signals, limited to five figures. 5. The name of every known place in the world, comprised in 127,000 signals; this code is limited to six figures.

A system of page and line indicates, by a glance at the group of figures, the particular page and line in the code book to which they (the figures) refer.

A system, essentially the same as the above, may be employed having letters, or a combination of letters and numbers, for its basis, instead of numbers only.

A moveable graduated scale may be employed to facilitate the finding of a specified line.

[Printed, 4*d*. No Drawings.]

A.D. 1866, June 20.—N° 1651.

MIROUDE, Adolphe.—"A new application of the electric light "for lighting buoys of every description."

The principal feature of this invention is "the lighting buoys at "sea in smooth and in shallow water by means of the electric "light, the production of which does not necessitate a continual "communication with the shore."

"I place in the buoy to be lighted, whatever may be its dimen-"sions and form, but arranged so as to keep in equilibrium, a "receiver or battery (of a size and weight in proportion to the "size of the buoy) producing an electric current, then a Ruhmkorff "induction bobbin, and lastly at its upper part I place a lamp "furnished or not with lenticular glasses, or glasses of any other "form, in which lamp I set one or several glass tubes or spheres "known as Geissler's tubes. A plate or roofing of metal or other "suitable material may be placed above as a shelter for the "apparatus."

"When the battery is exhausted, which will be perceived by "the diminished intensity of the light, it will only be necessary to "raise the battery through the manhole and replace it by another, "and to change if required the Geissler's tube; for experience "shews that after working a certain time the gas, whatever it may "be is more or less decomposed according to its nature (nitrogen "gas has been found to be the best)."

[Printed, 8*d*. Drawing.]

A.D. 1866, June 27.—N° 1718.

BAKER, James.—"Improvements in thermo-electric magnetic "batteries and engines."

The thermo-electric battery which may be used as a source of motive power, as well as to produce "effects analogous to those "of a galvanic battery," is constructed as follows:—The sides of a polygonal stove are surrounded with a metal casing; the smoke and heated air passes "from the upper part of the stove around "and between it and the casing to a chimney issuing from its "base, thus allowing the casing to absorb as much heat as "possible." The casing is air-tight, and is "fitted with a "weighted regulating valve on the upper surface communicating "with a valve at the base;" at a given temperature, the expansion of the air raises the valves and admits a cold draught of air. Insulated bars of a thermo-electric metal are arranged around the casing, "piled one upon the other;" each bar encloses a copper wire, and the copper wires are so connected that the current passes in the same direction in each bar in each pile. The same principle is adopted when two thermo-electric metals are used.

In the motive power engine, the poles of electro-magnets radiate from the axis of a wheel, the line joining the poles of the same magnet being parallel to the axis. Stationary electro-magnets are similarly placed in close proximity to those which are capable of rotating, but opposing to them contrary poles. By means of a wheel commutator, a stationary magnet and its moveable magnet are magnetised, each pair being magnetised in succession, and half the stationary magnets being always in the electric circuit.

Secondary currents from each electro-magnet may be used to magnetise "stationary electro-magnets or receivers arranged for "the purpose."

[Printed, 4d. No Drawings.]

A.D. 1866, June 28.—N° 1725.

HUBERT, François Thierry, and TRUSCOTT, Henry David Green.—"Improvements in the construction of general "electric telegraphic machines, and the mode of working them."

This invention consists of "the general electric telegrahic "machines, termed by the inventors 'typo-omnitelegraphic.'"

There is "a perfect accordance between the two connected "principal instruments, although placed at distant stations, the

"circuits between the stations being made, changed, and broken "by the regulating action of the horizontal metallic lever screwed "to the escapement of the electric mechanical power;" this accordance in the said action is obtained by means of another lever, which directs the currents.

One or more dials "oppositely screwed upon the ordinary dials "of the clocks used at any of the stations," enable the difference of solar time between the stations to be ascertained.

Each battery consists of a porous pot placed in a glass vessel containing pure water; upon the top of the said vessel is placed another glass vessel containing sulphate of copper solution, which passes through a tube in its neck to the pot. A helical copper wire and amalgamated zinc plate are the metals of the battery.

An "indicator" calls attention, gives time, and sends messages without disturbing the working of the message plates.

Local batteries, styles, metallic plates, and prepared paper are used at the sending and receiving stations. The main currents regulated by the prepared paper at the sending station, actuate an electro-magnet at the receiving station, which causes the completion of a local circuit and copies the message.

"The mechanical power is an electric clock," "causing the "regulating action of an horizontal metallic lever provided with a "tube containing quicksilver."

Many details are comprised in this Specification.

[Printed, 10*d*. Drawing.]

A.D. 1866, July 2.—N° 1749.

BONNEVILLE, Henri Adrien (*a communication from Pierre François Léon Péréme*).—"Improvements in the construction of "submarine telegraph cables."

These cables have "two interior coverings running parallel with "the electric conductor," and "an exterior covering or shielding "of tempered or non-tempered steel."

A conductor of copper wire, or of twisted wires, "is im-"mediately surrounded with wires of tempered steel coppered by "galvanoplastic process;" "these wires are placed longitudinally "and parallel with the conducting medium." "An isolating "envelope girds the wires thus twisted. The isolating envelope "is made of a flaxen, woollen, cotton, hempen, jute, or felt "material impregnated with paraffine dissolved in schist oil, to "which is added a small proportion of tar." "On this envelope

" is applied the second interior covering composed of tempered " steel wires, coppered or not, to which may be added one or two " thousandths part" " of white wolfram; this second covering, " like the first, is provided with an isolating envelope of same " composition, and it is on that envelope that the exterior cover- " ing is applied, which is a shielding of tempered or non-tempered " steel of variable thickness, according to the nature of bottom " the cable is to come in contact with in its length, to which it " would be well to add some white wolfram. This steel shielding " is wound round spirally" [helically?], " so that at each turn the " spire may still slightly cover by its edge the preceding spire, and " so on in its whole length."

When several conductors are employed, the steel wires of the second covering are of different diameters, distributed in all the spaces, and either insulated or not. "The exterior covering alone " turns spirally."

[Printed, 8*d*. Drawing.]

A.D. 1866, July 2.—N° 1751.

BONNEVILLE, HENRI ADRIEN (*a communication from Pierre François Léon Péréme*).—" Improvements in the construction and " laying down of subterraneous telegraph wires."

This invention " relates to the novel preparation of telegraphic " wires to be placed under ground, and to the manner of placing " them there. Their preparation consists in surrounding them " with three isolating envelopes."

" The conducting media are wires of copper, iron, or iron " coppered by galvano-plastic process; they are composed of a " single wire of variable diameter, or of several wires twisted " together." " These conductors are wrapt round with bandages " of felt, cotton, wool, hemp, jute, or any other textile material in " a long spiral" [helical?] " form impregnated with tar taken " from the distillations of bituminous schists very rich in oil and " paraffine. Thus prepared these wires are sewn to any quantity " in an envelope of one of the stuffs above given, done over with " tar of the peculiar composition also above given, so as to " separate the wires a little, confined as they are by two seams, " and to preserve an interval of at least two centimetres from " axis to axis; the whole is then wrapt up in a second envelope of " felt or or any other coarse stuff" " done over on the inside with

"schist oil charged with paraffine, and on the outside with tar "already described. This second envelope is attached to the "whole apparatus by seams in the interspaces of the wires." "When about to be laid down the cable thus prepared is covered "over with a sheet of paper tarred on both sides so as to pre- "serve it from immediate contact with the ciment, mortar, sand, "or earth which surrounds it, and in which several superposed "envelopes might be enclosed."

[Printed, 8*d*. Drawing.]

A.D. 1866, July 9.—N° 1803.

BAINES, WILLIAM.—"Improvements in the manufacture of "telegraph and signal pillars or posts, and in rolling iron for other "uses."

For telegraph and signal posts the following constructions are used:—If the post is to consist of one piece of rolled iron, its horizontal section is cross-like, and it tapers from end to end on one side; the ribs "on the other side are parallel." The iron plates may be rolled "of a width suitable for two or more" posts, and then cut in inclined directions. A post may be formed "of "two plates rolled thin in the middle," and of progressively greater thickness from the centre outwards; ribs and grooves in the centre of the plates enable them to be joined. Flat plates may be bent in the centre, so that their horizontal section (when they come together) forms a cross. Tubular posts may be made with external ribs; two or more vertical sections come together by means of flanges, which have ribs and corresponding grooves, and are secured by bolts or rivets. In some cases the combined sections may be passed together through rolls, and thus be fastened together.

"When rolling plates for various purposes in order to obtain "butt joints with a flush surface on one side, where several plates "are brought together, each plate at one edge is rolled with a "recess suitable for receiving the plain edge of another plate so "as to overlap the recessed edge of the next plate;" ribs and grooves are "formed in the parts which are to overlap in such "manner that the rib of one plate may enter the groove of the "other."

[Printed, 10*d*. Drawing.]

A.D. 1866, July 11.—N° 1825.

FARMER, Charles William, PARTRIDGE, William Edward, and WEBB, Byron Jesse Philip.—(*Provisional Protection only.*) "Certain improvements in connectors for "uniting wires, bands, ropes, or electric telegraph cables, or other "like ropes or cables composed partly of wire and partly of hemp "or other desirable compound material."

"Our improvements in relation to the uniting or connecting of "wires or compound wires, and other materials, such as telegraph "and fence wires, cables, or ropes of a general circular form in "their transverse section in contradistinction to flat surfaces, such "as leather banding, consist in taking such circular forms, "whether wire, ropes, or cables, and laying one end on the other, "and encompassing them with a metal clip with or without an "inner bearing plate, and by means of a screw or screws working "through the clip we are enabled to securely hold the two ends "in contact, and if additional security is required two or more of "the said clips may be used. Where the material desired to be "held or secured is flat in the transverse section, such as banding "for working over pulleys for giving motion to machinery, we "employ two clips which by preference we make of metal, and "by means of a screw secured to the inner plate or clip (the said "screw passing through a central orifice in the outer clip) and "the addition of a nut the two may be so securely screwed "together as to hold between them the ends of a band, thus "forming a secure and ready connection, which may be released "or again secured for altering or tightening the band as may be "requisite, but where the banding is wide an additional screw or "screws may be used."

[Printed, 4*d*. No Drawings.]

A.D. 1866, July 13.—N° 1843.

JOBSON, Robert.—(*Provisional Protection only.*) "Improve-"ments in apparatus for holding suspended electric telegraph "wires."

These improvements "consist in applying to each or to such "number of the supports as may be desired, eccentric nipping "apparatus or instruments which will prevent the wire slipping

" on the supports." Ordinarily, the nipping instruments comprised in this invention are arranged so that the nipping instrument at one support prevents the wire from slipping in one direction only, whilst the instrument at the next support prevents the wire from slipping in that direction only in which it is free to move in the before-mentioned support, and so on in "the succeeding points of support."

The nipping apparatus may be arranged to prevent the wire from slipping in either direction "by having two nipping instruments acting in opposite directions at each point of support, or a single nipping instrument arranged to be double acting by having two eccentric surfaces." Each nipping instrument is placed on an axis fixed to the cap, "and the surface which comes in contact with the wire is eccentric, so that in one direction the wire is securely nipped between the support and the eccentric nipping instrument." These nipping instruments also prevent the wires rising out of the notches in the points of support, "and where it is not desired to nip the wires at the points of support concentric wheels or pullies may be placed on the axes over the points of support, which will allow the wires to slip or move on their supports in either direction longitudinally, but will prevent them rising out of the notches or recesses in the supports."

[Printed, 4*d*. No Drawings.]

A.D. 1866, July 17.—N° 1867.

VARLEY, Cornelius, and VARLEY, Samuel Alfred.—"Improvements in electric telegraph apparatus."

1st. Needle telegraph instruments.—The outer case is of cast iron, and the bush of the axle is in one piece with the case. Two springs bear against the "bridge," and one or other of these is removed from the bridge by insulating pins on the upper end of the transverse piece, according to the direction in which the handle is moved, thus sending positive or negative currents along the line.

2nd. Galvanometers.—Prepared and cemented segmental coils are packed closely in a circular chamber, leaving a central space therein. The compound needle to this compound coil consists of a circular soft-iron disc with radiating bars pivoted in the pole of a permanent or electro-magnet, from which they are magnetised.

Copper ribbon is obtained by electro-depositing copper upon prepared paper.

3rd. Relay contacts.—The relay arm beats against small gold wheels, that are rotated by clockwork, "in the same plane as the "relay lever." Moving contact is thus obtained.

4th. Lightning conductors.—According to one plan, the space between two terminals, in an insulating chamber, is filled by finely-divided charcoal or other powder. When very perfect protection is required to the coils, two metallic cylinders (pointed at the ends) are inserted into the slightly conical openings of a hole in a cylindrical piece of glass, and fixed therein by means of lead-coated shoulders, so that the points nearly touch, but not quite. By means of a hole in one of the metallic cylinders, powdered charcoal is made to cover the two points, and the interior of the glass cylinder is exhausted of air.

Many details and modifications of the 1st and 2nd portions of this invention are described and shown.

[Printed, 1s. Drawing.]

A.D. 1866, July 19.—N° 1878.

GILLARD, Joseph Pierre.—(*Provisional Protection only.*) "Improvements in apparatus for accelerating the generation and "transmission of electricity."

These improvements "relate to a mechanical arrangement" called an "electro-polyphore, in which a quick revolving motion "is imparted to an arbor of iron or other suitable metal provided "in an isolated manner with a series of pairs of metal blades to be "carried in contact with a series of metal conductors fixed in the "inner periphery of a drum, in the centre of which revolves the "above mentioned arbor. The metal blades are connected to a gal-"vanic battery, or magneto-electric machine, or other suitable gene-"rator of electricity, in such manner that one blade of each pair "forms the positive and the other blade the negative pole of the "circuits; the conductors also form pairs, one conductor of each "pair being set in contact with the positive blade and the other "with the negative blade of a pair of blades; besides one conductor "of each pair is connected to one wire, and the other conductor "of the pair to another wire, so as to enable each pair of wires to "form an electric circuit, or the current may be caused to pass "through an induction coil or bobbin. A revolving motion at "high speed being imparted to the arbor an electric circuit will

" be formed at each time each pair of blades comes in contact " with one of the pairs of conductors, and as this will take place " a great many times in one second the apparatus will cause the " electricity to be abstracted in an efficaceous manner from the " galvanic battery or other suitable generator of electricity with " which the apparatus is put in contact."

[Printed, 4d. No Drawings.]

A.D. 1866, July 25.—N° 1934.

BROOMAN, CLINTON EDGCUMBE (*a communication from Mayeul Bernabe*).—(*Provisional Protection only.*) " A new or im-" proved process or method of treating armour plates to render " them inoxidizable."

" This process or method is based upon the employment of " electro-metallurgy applied to cover the plates with an insulating " and protective coating of copper, the effect of which when so " produced is by a peculiar action of neutralization of the electric " currents to render the plates quite inoxidizable."

" The plates are shaped, perforated, and prepared for putting " together before being submitted to the three following opera-" tions."

1st. The plates are cleaned by immersion " in a vessel con-" taining a suitable acid liquid."

2nd. " The cleaned plates are placed in a bath made alkaline " by cyanide of potassium." In the vessel containing the said liquid " is a plate of copper facing, and of the same dimension as " the armour plate;" an electric current is then established, by means of " a galvanic pile," which causes a deposit of copper " upon the armour plate; in a few hours the layer deposited is " sufficiently thick to insulate or separate the iron."

3rd. The first layer of copper which covers the armour plate is strengthened " by submitting the plate to a second galvanic " coppering" " in an acid bath of sulphate of copper." " The " plates should be left in this bath for from one to two days, " when the coating of copper will be sufficiently thick."

[Printed, 4d. No Drawings.]

A.D. 1866, August 1.—N° 1979.

BEAUMONT, WALTER, and McMASTER, WILLIAM.—" Im-" provements in apparatus for holding and releasing cords, chains, " ropes, and bands."

The more immediate application of this invention "is the "holding and releasing" of the cords of Venetian blinds.

This apparatus may be attached to any convenient form of bracket, "and it consists of a combination of a swivel piece "which works or turns on a stud or axis, and one or more "tumbler catches pivoted on the swivel piece, the tumbler catches "being inactive except when holding the cord or cords which "pass through the apparatus."

The Drawings show various modifications of this apparatus applied to Venetian and roller blinds.

A modification of this invention "may be applied to *prevent the* "*loss of the submerged end of a telegraph cable* in case of break-"age during the process of paying out, for this purpose the "swivel piece is provided with two cross bars, and the tumbler "catch is made with a grooved pulley of sufficient diameter for "the cable to pass over; to each cross bar is connected one end "of a chain or cord, these chains or cords are of different lengths, "to the other end of the shorter is attached a metal ball and "upon the longer is attached a wooden ball at a greater distance "from the apparatus than the metal ball; the end of the longer "cord or chain is connected to the paying-out vessel; the cable "passes freely through both these balls under the two cross bars "and through the tumbler catch, and the parts remain in these "relative positions so long as the cable continues to be paid out. "In case the cable breaks the balls will pass over the broken end "of the cable, and the shorter cord will then cease to act on the "apparatus, and the longer cord will then cause the tumbler "catch to bind the cable against one of the cross bars."

[Printed, 1*s*. Drawings.]

A.D. 1866, August 2.—N° 1989.

MARSHALL, William Alfred.—(*Provisional Protection only.*) "A new and improved method for insulating and pro-"tecting electric telegraph wires for submarine, subterranean, "and other lines, with improvements in the machinery, and in "the process and material."

A leaden tubing is made to enclose one or more insulated wires, the "moist heat" from liquid "parafin wax" preventing the insulator from being burned during the process.

The conducting wire (whether already gutta-percha-covered or not) is covered with a fibrous substance, then placed in a bath of

liquid "parafin wax," "and after becoming thoroughly saturated "is allowed to cool." The tube forcing machine has an inner chamber with a suitable orifice, also an orifice in the plunger, so as to supply the covered wire in a central position for coating with metal; the outer end of this interior chamber is turned up, "so "as to form a vessel to contain the liquid."

"When the metallic tube is being formed, the covered wire "passing through the inner chamber is kept saturated and sur-"rounded by the insulating liquid, and as it passes through the "small orifice or hollow triblet in the die, where it is enclosed by "the metal, sufficient of the liquid passes with it into the tube "to fill up the interstices in the fibrous material and any cavity "between it and the metal, rendering the whole when cool a "compact insulating body between the two metals."

[Printed, 4*d*. No Drawings.]

A.D. 1866, August 4.—N° 2015.

VESCOVALI, Angelo.—(*Provisional Protection only.*) "Im-"provements in the mode of and apparatus for increasing the "adhesion of locomotive engine wheels to their rails."

"A novel arrangement of electro-magnetic apparatus" is applied to the locomotive engine; by maintaining electric currents through the magnet coils, the engine wheels have such adhesion to the rails as to enable the said engine "to mount steep inclines "with facility."

Two coils are applied to each of the three wheel axles; a longitudinal compound soft-iron bar connects "all the axles together, "and thereby increases the magnetic force of the apparatus." The electric current circulates through the six coils in series. The poles of the central electro-magnet are reversed as compared with the electro-magnets on either side thereof.

"To ensure the proper amount of adhesion of the wheels to the "rails with this apparatus in action it is only necessary to pro-"vide a suitable form and weight of rail." The inventor has found "that the amount of metal contained in the rail (supposing "the rail to be of suitable form, say a double-headed rail) deter-"mines to a great extent the amount of adhesive power generated, "and that the effective power of the magnets is limited, and "beyond a certain point not capable of increase with the increase "of battery power beyond that point, if, for example, rails of the "ordinary form and weight are used."

"The wheels may be furnished with thin steel tyres without "detriment to the action of the electro-magnetic apparatus."

[Printed, 4d. No Drawings.]

A.D. 1866, August 9.—N° 2052.

LAKE, William Robert (*a communication from Alexander John Baptist de Morat*).—"An improved telegraphic cable."

The invention consists in:—

1st. "Combining a number or series of separate tubular or "cylindrical conductors, one within the other, to form one cable, "through which a number of different despatches or telegrams "(equal to the number of tubes or cylinders) may be sent at the "same time."

2nd. "The spiral" [helical?] "construction of the said "tubular or cylindrical conductors, whereby an elasticity is "obtained which will effectually prevent the breaking of the "interior conductors."

3rd. "Providing an outer cylinder or tubular metal covering, "which forms a neutralizing conductor, to guard or protect one "or more of the interior conductors and allow them to retain at "all times their full galvanic power of transmission by neutra- "lizing the influence of all inductive and earth currents.

"The core or interior of the cable is formed of one or more "iron, copper, or other metallic wires. Around these a strip or "band of copper or other metal is wound closely in a spiral "manner; over the joints of this spiral covering another metallic "strip is similarly wound. The whole is then thinly but com- "paratively covered with india-rubber, gutta percha, or other "insulating material; over this insulating material two more "metal strips are wound in the manner above described. This "process is continued according to the required number of con- "ducting cylinders or the desired size and strength of the cable. "The whole is then covered with jute or otherwise protected in "the usual manner."

[Printed, 6d. Drawing.]

A.D. 1866, August 15.—N° 2095.

WEBSTER, James.—"Improvements in coating and recovering "metals from chlorides and other solutions of metals."

This invention relates to the withdrawal of the metallic zinc from "the refuse flux or chloride of zinc," the said metallic zinc being used to coat "copper, brass, or iron plated with copper or "brass," so as to protect it from oxidation.

One method set forth is by adding scrap tin or thin sheet wrought iron scrap to the boiling chloride of zinc, the temperature being about 600° Fahrenheit. If scrap tin be used, the said coating (obtained by dipping the article into the molten chloride and bringing it into contact with the said scrap) will consist of tin and zinc.

Another method consists in attaching a copper article to a piece of wrought iron and immersing them in an aqueous solution of chloride of zinc. In this process the whole of the zinc may be withdrawn from the chloride, iron taking its place.

When sufficiently charged with iron, the dipping water used after the coating process, may be boiled down. The crystals obtained from it may "be utilized for dyeing and other pur-"poses."

After copper scrap has had zinc deposited upon it by either of the above processes, it may be melted down to form brass.

"In like manner a battery may be used to increase the "depositing zinc as in the ordinary way."

[Printed, 4*d*. No Drawings.]

A.D. 1866, August 21.—N° 2141.

WRIGHT, Henry Banks.—"Improvements in laying and "sustaining in position telegraph cables."

This invention relates to laying buoyant telegraph cables; if the cable be broken, one or both ends will rise to the surface, and the cable may be easily repaired.

Upon paying-out the buoyant cable from the ship, a buoy is attached to it; the said buoy is of copper, hollow, air-tight, and elliptical. A swivel and chain are attached to the central portion of the buoy, so that the buoy "may rotate freely, and the ends "thereof rise and fall." The buoy will, "like the common "fisherman's float or trimmer, tend to clear itself of seaweed "and 'right' itself in case of storms and currents." At a given depth a weight is attached to the chain; the weight is "cup-like," and is therefore "retained in its normal position, or nearly so. "And the said weight may be in the form of two cups, one "inverted beneath the other." More weights may be attached to

the chain at intervals. It is preferred to place the buoyant cables attached to the chain "between the first and second weights." The above-mentioned arrangements are repeated at suitable intervals across the ocean. "Instead of using the buoys or floats "aforesaid I could, if thought desirable, make the buoyant cable "or cables of such specific gravity as to sustain the weight of "such length of chain or buoyant or partially buoyant rope as "may be between the cable or cables and the bottom of the "ocean, and in such case the use of weights might be dispensed "with, when it would be desirable that the aforesaid chain or rope "should have an anchor at the bottom."

The Drawings show the details of the above-described arrangements, also sections of buoyant cables with one and five conductors respectively.

[Printed, 8d. Drawing.]

A.D. 1866, August 23.—N° 2168.

WELCH, William.—"Improvements in the manufacture of "cement compositions, and in the method of applying and "securing plastic cements to iron and other surfaces."

In this invention "the principles contained in" No. 580 (A.D. 1866) are practically resolved and developed.

Amongst the cements comprised in this invention are certain "electric magnetic compositions for coating and preservation of "iron, wood, and other substances exposed to marine uses, "whereby an insulatory waterproof protection is secured, and a "system of galvanism obtained for antifouling purposes."

To make the compositions, "the varied geological strata" are "classified into electric and non-electric, or conducting and non-"conducting grades." The pulverised substances are calcined in air-tight or exhausted vessels, to which the requisite heat is applied by means of exterior jackets; heat may be admitted, or gases or liquids injected into the said vessels during the time that they are made to rotate on their axes.

The compositions are applied to the surfaces to be coated either by a brush or by rolling or transferring machines.

In working out the "cementitious processes" of this invention, it will be proper to conceive that the whole of the substances involved "possess natural electric energies inherent in themselves "whether in a state of combination or not."

The cements "answer best when the components, as stones, "ores, minerals, &c., are placed in combination as nearly as pos- "sible, as found connected in their natural veins or beds."

[Printed, 6d. No Drawings.]

A.D. 1866, August 30.—Nº 2236. (* *)

MELLOR, JAMES MONTAGUE.—"Softening, disintegrating, "and bleaching vegetable fibres."

"A solution of carbonate of soda, or sal-soda, or other alkali, "at from one to ten degrees Baumé, and about an equal quantity "of lime water, mixed together," is used. A current of electricity is in some cases made to pass through the solution while such material is immersed therein, such electricity also itself acting upon the material as a softening or disintegrating agent. Or in place of electricity, ozone may be used, such ozone being forced through both solution and material. The solution is to be used either with or without electricity or ozone, as the "nature "of the fibre indicates."

For bleaching vegetable fibres the patentee employs "a com- "bination of about equal quantities of solution of chloride of "lime, at from one to five degrees Baumé, and solution of car- "bonate of soda, or sal-soda, or other alkali at about the same "strength," electricity or ozone being also used in the process or otherwise, "according to the nature of the fibre to be acted upon."

"Electricity and ozone may also be employed, separately or in "combination with any suitable substance other than the solu- "tions herein-before described for softening, disintegrating, and "bleaching vegetable fibres."

[Printed, 4d. No Drawings.]

A.D. 1866, September 5.—Nº 2283. (* *)

ROBINS, HENRY.—"Improvements in sheathing iron ship "and other floating bodies, and other iron structures subject to "the action of sea and other waters." For these purposes, the iron surface to be sheathed has formed in it at suitable intervals apart dovetail grooves or recesses, each groove being divided longitudinally by a wedge-formed projection, which stands up from the bottom of the groove; the sheathing plates, which may be of zinc or other suitable metal, are rolled or formed with projecting ribs or flanges to enter and be firmly wedged into the

undercut dovetail grooves in the iron surface. The ribs are held firmly in the grooves by wedge-formed projections from the bottom of the grooves, bending out the ribs of the sheathing plates, and pressing them against the undercut sides of the grooves, so holding them securely. The depth and width of the grooves in the iron surface may be varied, but it has been found that a depth of one-eighth of an inch is in most cases sufficient to hold the plate securely. In order to connect together the adjoining ends of two plates of sheathing metal, the inventor sometimes bends over the ends of both plates, and hooks them one over the other, a solution of india-rubber, or other suitable cement or paint, being placed between the lapped ends of the plates to make a water-tight joint.

[Printed, 8*d*. Drawing.]

A.D. 1866, September 5.—N° 2285.

NEWTON, Alfred Vincent (*a communication from Ernest Van Bruyssel*).—" Improvements in the construction of electric " clocks, and in the means employed in working the same."

This invention relates to " apparatus to be employed in con- " nection with a regulating pendulum clock for indicating simul- " taneously," at distant points, the time upon clock dials.

The arbor of the minute wheel of the regulator rotates the axis of a commutator once in two minutes; copper discs and platinum pieces (suitably insulated) in the ivory cylinder that forms the commutator axis, in connection with fixed springs surrounding the said axis, distribute the electric current in succession to the time indicators, positive and negative currents being alternately sent through the line wires.

Each time indicator consists of a clock dial and hands, fitted with spur gearing that is driven by an escape wheel and pallets, the pallets being vibrated by the alternate action of a fixed electro-magnet's poles upon a magnetic bar connected with the pallets. Thus the before-mentioned alternate currents drive the indicators.

A modification of the commutator consists of a rotating cylinder that carries distributing springs, the battery and other connections being made by the dipping of the said springs into stationary mercury cups. In the first-described commutator mercury cups are only used in connection with the copper discs.

The driving gear for working the time indicators may consist of a ratchet wheel and clicks; the rocking lever and the magnetic

armature may be in one piece; and, lastly, the pins of the escape wheel may project through its periphery.

Induced currents, either from coils or from magnets, may be used to work the time indicators.

[Printed, 1s. Drawing.]

A.D. 1866, September 10.—N° 2329.

JOHNSON, JOHN HENRY (*a communication from John Montgomery Batchelder*).—(*Provisional Protection only.*) "Improve-" ments in electric telegraph conductors."

"This invention relates to a peculiar construction of conductors " for electric telegraphs, whether intended as submarine cables, or " otherwise, whereby 'kinking' is avoided and greater pliability, " elasticity, and strength are obtained combined with facility for " giving any required proportion or relation between the tensile " strength and of the conducting power of the line or cable. The " essential feature of this invention consists in the manufacture " of electric telegraph conductors by braiding or interlacing in " lieu of twisting together any desired number of wires made " either of the same metal or of two or more dissimilar metals, " such, for example, as iron or steel and copper, the iron or steel " although not such good conductors as the copper tend greatly " to increase the tensile strength of the cable. Two or more of " these braided conductors may be combined together to form a " submarine cable, each conductor being separately insulated, and " the cable then made up of a series of such braided conductors " bound or held together in any convenient manner. When " required to be suspended from posts for land telegraphs the " braided conductors may be employed singly and without an " insulating covering."

[Printed, 4d. No Drawings.]

A.D. 1866, September 14.—N° 2360.

CAIRNS, ALEXANDER.—" Improvements in the construction of " liquid compasses."

1st. " Means for reducing weight and friction on the pivots." —Combined with the needle or needles and card is " a hollow air-" tight buoying float of a dome-like or other shape, the said float " being placed over or on a level with, but not lower than the " needle or needles;" according to another plan, the card may be

made hollow; in a third modification, a hollow disc-like vessel is attached to the card. The weight of the combined parts should be rather more than the weight of the liquid which the said parts displace.

2nd. Securing the above-mentioned advantages, and "protect-" ing the magnetic needle or needles from the action of the "liquid thereon."—The needle or needles are placed inside the hollow card or the hollow disc-like vessel attached to the card.

3rd. "Means for allowing for expansion and contraction of the "liquid in the bowl or vessel by increase or decrease of atmo-" spheric or other temperature."—A concentrically-corrugated thin plate of ductile metal "is introduced into or made as part of "the bowl or vessel. The variations in temperature simply "cause the piece of metal or elastic agent to move slightly out-" wards or inwards as the case may be." According to another means of carrying out the invention, a pipe "descends from the "bottom of the compass bowl" "and dips into a partially-filled "vessel;" the air in the annular space above the liquid in the said partially filled vessel is compressed upon the increase of temperature.

The Drawings show the above improvements, and particularly many modifications of the compass needle floats.

[Printed, 10*d*. Drawing.]

A.D. 1866, September 26.—Nº 2480.

BONNEVILLE, Henri Adrien (*a communication from Bernard Meyer*).—"Improvements in transmitting facsimile copies "of writings and drawings by means of electric currents."

One of the peculiarities of the plan of working which constitutes this invention is that chemically-prepared paper is not employed.

In the receiving instrument, "a blade wound helically round a "cylinder, forming only one revolution," is rotated by clockwork. The blade is constantly inked and marks the paper strip, or not, according to the non-action or action of the lever armature of the line-wire electro-magnet. Whenever the electric circuit is broken by the non-conducting ink in the transmitter, an ink mark is made on the continuously-drawn paper strip of the receiver by the by the pressure of the said paper strip against the blade.

In the transmitting instrument, metallic paper, like the paper strip above-mentioned (the width of which is equal to the pitch of

the helical blade) has the message marked upon it in non-conducting ink, and passes under a metallic tracer at the same rate as the paper strip travels. Thus the cessations of the electric current made by the contact of the tracer with the ink are copied in ink at the receiving station.

The working of the apparatus is rendered synchronous :—

1. By a massive fly wheel with flyers, which is constantly rotating. 2. By a "corrective wheel" brought into action only at certain intervals by the passage of a "corrective current" through the coils of a particular electro-magnet. The fly wheel and the "corrective wheel" work simultaneously.

[Printed, 8*d*. Drawing.]

A.D. 1866, September 26.—N° 2491.

CLARK, WILLIAM (*a communication from Alfred Ely Beach*).—" Improvements in the collection and delivery of letters, parcels, " and other freight, and in apparatus for the same."

In this invention cars are made to travel in tubes by the pressure of air or by other means.

This invention may be used in connection with that described in No. 2049 (A.D. 1865).

Amongst other improvements, this invention consists in the combination of an electro-magnetic apparatus with the depository or receiver of the letters, and also with the car, and with the tube, or with either of them in such manner that the car may receive or deliver freight at given places, and pass other given places without receiving or delivering.

Inclined planes or studs are placed in the tube so that they may be struck by certain rods on the car, and thereby cause the discharge of the contents of the car, or, if the studs are differently arranged, the rods pass by them without any effect upon the car. An electro-magnetic apparatus arranged to discharge the contents of a car at a given station, consists of a stud with a lower and vertical limb in the tube, and an upper and horizontal limb outside the tube that forms the armature of an electro-magnet. When the electric circuit is closed, by means of a circuit key, the stud is prevented from rising when struck by the rod; otherwise, a spring arrangement permits it to rise when the rod passes, and the car proceeds without discharging its contents. In another modification the car itself opens and closes the circuit at proper times.

A somewhat similar electro-magnetic and mechanical arrangement is employed to collect the letters into the passing car.

The car may have its speed reduced (when passing a station) by means of an electro-magnetic arrangement, which opens an air-valve, and thus reduces, for the time, the pneumatic pressure upon the car.

When a car is to stop at a certain station, it is switched on to a siding; for this purpose an electro-magnet may act "upon the "shaft of the cam or other device connected therewith or with "the switch to be moved."

[Printed, 1s. 8d. Drawings.]

A.D. 1866, September 27.—N° 2495. (* *)

BAYLEY, JOHN CLOWES, and CAMPBELL, DANIEL.—(*Provisional Protection only.*) "Improvements in the sheathing of iron "ships." The portion of this invention which relates to the subject of the present series is for sheathing with a metal electrically positive to iron, and consists in having sheets of zinc sufficiently large to admit of being folded over the edges of the iron plates corresponding therewith. In constructing the ship, space should be left between the plates at the butt joints (it being understood that all that portion of the hull which requires sheathing is built upon the butt-joint principle) rather more than sufficient to allow of the said turned-over edges of the sheathing being inserted, and when thus placed the space between is filled up with oakum, lead, or other suitable material which will admit of being caulked hard, and thus not only bind the sheathing to the ship, but in the case of zinc sheathing being used, press it hard to the edges of the plates, thus bringing them into perfect galvanic contact. The surfaces thus brought into contact being sufficient to keep up galvanic action, marine glue or other adhesive substances may be used over the other portions of the zinc plates to bind the same to the iron.

[Printed, 4d. No Drawings.]

A.D. 1866, September 28.—N° 2513.

CLARK, WILLIAM (*a communication from Joseph de Susini, Jean Marie Onésime Tamin, and Emile Bondonneau*).—(*Provisional Protection only*). "Improvements in the means of reproducing "signs, characters, and other marks in the transmission of messages and signals by electric telegraph apparatus."

The object of this invention is to re-transmit the marks of electro-chemical telegraphs. For this purpose the inventor avails himself of "either electro-chemical and galvanoplastic means or "any suitable daguerrotype" [daguerreotype?] "or photographic "process."

The following process is used in an example of an "electro-"chemical or galvanoplastic" process:—A strip of paper, impregnated with a solution of peroxide of manganese or cyanide of potassium, is applied to the receiving apparatus, in which the telegraphic signs are produced by electro-decomposition, in a different colour to that of the ground of the strip; the strip is then placed in an electro-silvering bath, and the signs are thereby coated with silver. The strip is then rubbed with mercury, which adheres only to the silver, and is covered with lithographic ink. This strip being used in the first relay gives a telegram similar to that used in the first transmitting apparatus; it thus occurs that every alternate relay produces a similar telegram, the odd relays giving the message in non-conducting characters and the even relays in conducting characters.

In an example of a "daguerrotype or photographic" process, a photograph, and ultimately a photo-engraving, of the strip of the receiving apparatus is used "to operate from relay to relay."

This invention is applicable to the systems of "Caselli, Bonelli, "Lenoir, Hughes, and Gaiffe."

[Printed, 4*d*. No Drawings.]

A.D. 1866, September 28.—N° 2514.

CLARK, WILLIAM (*a communication from Joseph de Susini and Jean Marie Onésime Tamin*).—"Improvements in electric tele-"graphs."

This "writing telegraph" is actuated by means of a prepared strip at the sending station, which is copied on a chemically-prepared paper at the receiving station, "the receiver and trans-"mitter being rendered synchronous in their action by the "electricity of the line."

A paper or metal strip passes over a cylinder, and is held in contact therewith by means of a "comb" composed of a number of insulated platinum points. A commutator (having as many platinum "breaks" as there are points in the comb, which "breaks" respectively communicate with the points of the said comb) is mounted on a pendulum above its point of suspension,

so as to form the upper arc of the said pendulum. The pendulum "receives to-and-fro motion from two or more "bobbins" "forming electro-magnets, and fixed to the framing, they being "in communication with" a local battery. A fixed stop communicates the line-wire current to the "breaks" of the commutator as they oscillate before the said stop. Every time that a tooth of the comb touches the insulated ink of the message strip, the current passes by the line wire to the tooth of a corresponding comb in the receiving apparatus, and there influences the receiving strip accordingly. A catch on the pendulum axis advances the strip "at each movement." "The synchronous action is regulated by "a plunger" "fixed to the pendulum, which, by dipping in a "small trough" "of mercury forms a circuit, the which, by "electrifying the two or more bobbins" of the pendulum will cause them to separate from the fixed bobbins of the local circuit.

Arrangements may be made to despatch or receive two or more messages at one time.

[Printed, 8*d*. Drawings.]

A.D. 1866, October 3.—N° 2542.

SPAGNOLETTI, CHARLES ERNESTO.—(*Provisional Protection only.*) "Improvements in arranging and combining apparatus "for communicating between the guard, engine driver, and "passengers in a railway train."

Two insulated wires are attached to each carriage in the train; they are joined between each carriage by means of iron bars, pieces of metal cable, or galvanized connecting rods. The connecting insulated wire runs through the hollow buffer rod. In each compartment of the carriages is a handle in connection with an iron rod, at the end of which, outside the carriage, is fixed a plate perforated with the number of the carriage compartment; on turning the handle, electrical connection is made with bells on the engine and in each guard's van. The guard can see which compartment rang by means of the metal plate. "The metal "plate may be also thrown into sight by means of a spring re- "leased by turning the handle before mentioned. A lock appa- "ratus is attached to the handle in such manner that after the "handle has been turned it cannot be replaced by the person "turning it, but must be done by the guard. On the engine is

" placed a bell-disc instrument and battery attached to the insu-
" lated wires. Each van is provided with a bell, battery, key,
" and switch, the latter instrument being for adapting the vans
" for any position in the train (intermediate, terminal, or reversed).
" The disc instrument shows two signals, 'stop,' on a red
" ground, 'stop at next station,' on a green ground." "By this
" system passengers ring to all the guards, and the driver of the
" train, and the guards can ring to each other and the driver."

[Printed. *4d.* No Drawings.]

A.D. 1866, October 10.—N° 2623.

BRANDON, ALEXANDER HORACE (*a communication from George Lionel Leclanché*).—" Certain new and useful improve-
" ments in electrical apparatus."

1st. " The electrical generator."—Into a glass jar is introduced a porous cell, which receives a graphite plate. The porous vessel is filled up with a mixture of pulverized peroxide of manganese and powdered graphite, and the jar is filled up with sawdust, a zinc plate being previously placed in the said jar. The requisite wire connections are made with the said plates, and " hydrochlorate of " ammonia " solution is placed in the porous cell as well as in the outer cell. The cork of the jar has holes for the passage of the conducting wires, and a third hole into which a glass tube is inserted; a piece of sheet India-rubber is secured to the wax of the cork over the tube, and is slit, so as to permit of the escape of gas, but to intercept the passage of the liquid, even if the jar be turned over.

2nd. " The electrical accumulator."—Two or more jars each contain two plates of graphite, or of an inoxidizable metal; these two plates are buried in powdered graphite, which is moistened with a solution of potash. One of the plates is inserted in a porous cell. If the current from the generator (or "pile") be passed, for a certain time, through the accumulator, and then the generator be disconnected, " by uniting the two graphites, a cur-
" rent is obtained is obtained which acts in the opposite direction
" of the pile."

A self-acting commutator, adapted to utilize the currents of the " generator " and " accumulator," in a telegraphic transmitting apparatus, is shown in the Drawings of the Final Specification.

[Printed, *8d.* Drawing.]

A.D. 1866, October 20.—N° 2716.

CLARK, William (*a communication from Joseph de Susini and Jean Marie Onésime Tamin*).—(*Provisional Protection only.*) "Im-" provements in electric telegraph apparatus."

These improvements in electro-chemical "writing telegraph "apparatus consist, 1st, in producing a rapid rotary motion as "opposed to the rectilinear motion of such apparatus as hitherto "arranged; 2ndly, in simplifying the construction of the appa-"ratus." A metallic strip (on which the message is written in insulating ink), at the sending station, sends the requisite electric currents along the line wire to produce a fac-simile of the message on chemically-prepared paper at the receiving station.

The following are the main features of the invention :—A train of wheels (having a motive barrel and a fly) imparts motion to a paper-moving cylinder, as well as to the cylinder underneath the "comb" by means of which the electric currents are sent or received. The strip is held down by the comb, the teeth of which act in accordance with the electric currents that pass into the telegraphic circuit, there being as many line wires as teeth to the comb. A similar machine is used to transmit and to receive. The circuit is so established that contact with the metal of the sending strip makes a short circuit, the insulated writing therefore sending currents along the line wire. A counter current may be established by a battery at the receiving station, so as to render the writing received more distinct than it otherwise would be. A commutator instantly converts a sender into a receiver, two cylinders being used, one for sending, the other for receiving. The apparatus need not be perfectly synchronous, and therefore needs no regulating mechanism.

[Printed, 10*d*. Drawings.]

A.D. 1866, October 24.—N° 2747.

PIERS, Eustace Fitzmaurice.—"Improvements in working "railway signals."

This invention consists in an arrangement whereby the wheels of an engine passing over a lever or treadle may raise a semaphore signal, so as to indicate danger to any following engine, until the engine in advance shall have proceeded beyond the point of danger, whereat is arranged another lever which the wheels of the

said engine may depress in passing, and the movement thus given will cause the signal previously raised "to fall to its normal "position."

In a case, at the base of the post, certain levers and electro-magnetic machinery are arranged in connection with a lever or treadle beyond the point of danger that is also in a case, and that upon depression breaks the electric current and liberates the keeper of the electro-magnet in the first-mentioned case, thus allowing the weight of the signal lever to restore the semaphore arm to its normal position.

When, in passing the signal post, the engine gives motion to the shaft of the signal lever and raises the semaphore arm, it also moves a short arm on the said shaft, so as to cause a catch bolt to slide up the inclined end of the armature lever of the before-mentioned electro-magnet, and to place itself above the said inclined end instead of below it, the latter being its normal position. When the engine reaches the lever that is beyond the point of danger, the consequent liberation of the electro-magnet's keeper, and of the weight at the end of the signal lever, restores the arm to its normal position, and leaves the catch so as to be ready for the next depression of the treadle and of the signal lever.

An electro-magnet wound in concentric cylinders is shown in the Drawings.

[Printed, 10*d*. Drawing.]

A.D. 1866, November 1.—N° 2836.

ROWLAND, Owen.—(*Provisional Protection only.*) "Improve-"ments in galvanic batteries, and in apparatus for testing the "insulation of telegraphic conductors."

In galvanic batteries, a plate of magnesium is employed as the positive element in each cell; the said plate is coated with a mixture of paraffin and wax, "leaving only the lower end of the plate "or bar exposed." The plate is immersed in a solution of sulphate of magnesium.

"The negative element in each cell consists of a plate or bar of "copper contained in a porous cell, and immersed in a solution of "a sulphate of copper."

According to another arrangement, the magnesium bar (coated as already described) is surrounded by a glass tube, "the lower

"end of which is cemented into the mouth of a cup made of "porous material;" "this tube and cup are filled with a solution "of sulphate of magnesia. The porous cup, and the lower end of "the tube, are surrounded by a cylinder of copper, which forms "the negative element, and is contained within an outer vessel "charged with a solution of sulphate of copper." A positive zinc plate may be coated in the above-described manner.

In testing the insulation of telegraph conductors, the part of the insulated conductor to be tested is passed down into a bath of sulphate of magnesium, and through a magnesium cylinder; "the "conductor is connected with one end of a galvanometer coil, and "the magnesium cylinder with the other; then the slightest "galvanic action will be indicated by the deflection of the galva-"nometer, and this deflection will indicate that the conductor "is exposed or imperfectly insulated at the point then under "examination."

[Printed, 4*d*. No Drawings.]

A.D. 1866, November 3.—N° 2862.

GISBORNE, JOHN SACHEVERELL. — (*Provisional Protection only.*) "Improved automatic means and apparatus to give warn-"ing of the dangerous existence of fire in warehouses, ships, and "other structures and places."

Two metallic conductors are placed close to each other; in this position they are electrically insulated by a material liquifiable at low temperatures. The said conductors are then connected "to "the ceilings or other parts of structures, or through or amongst "goods, thence to the police office or other place where the signal "is to be given." One or both of the wires are connected to a galvanic battery; "when one only is connected the electric circuit "is not made, and no current reaches the signal end. So soon, "however, as the gutta percha or insulating material becomes "softened or melted by increase of temperature the wires will "touch each other," thereby operating the signalling apparatus. "When the ends of both wires are connected to the battery then "a current passes constantly through to the signal end; in the "event, however, of the wires touching each other, then the cir-"cuit will be shortened, and so cease to reach the signal end, at "which time a signal will be given." Instead of either of the above arrangements, quicksilver is sometimes used; this is

placed "in bulbs and tubes of glass," which are put in "different
"exposed places in structures or amongst goods. Any increase
"of temperature causes the quicksilver to rise, come in contact
"with a conducting wire, and complete an electric circuit so as
"to give a signal."

[Printed, 4d. No Drawings.]

A.D. 1866, November 3.—N° 2863.

GISBORNE, JOHN SACHEVERELL. — "Improvements in mari-
"ners' and other compasses."

The object of this invention "is to protect the magnetic needle"
"from local attraction or influences."

The needle or needles and card are supported on or between pivots in the ordinary manner; these are surrounded "by a
"spheroidal or other suitably shaped vessel open at top and
"bottom, made of one or more pieces of metal. The said vessel
"is as a whole or in parts or segments covered with insulated
"copper or other wire, and a current of electricity from a battery
"is passed therethrough." The magnetic needle is thus placed
"under equal influences at all times; when the needle or needles
"dips or dip, its or their ends are equidistant respectively from
"the upper and lower edges of the of the openings in the said
"vessel."

Another method of protecting the magnetic needle is "by so-
"called mechanical means;" the needle or needles and card are encircled "by a cylindrical or other suitably shaped metallic vessel
"open at the top and sometimes also at the bottom. The thick-
"ness of the metal is made such that local attraction will be
"counteracted. To prevent the vessel from acquiring natural
"polarity," a rotary motion round a vertical axis is given to it by clockwork or other means.

The Drawings represent an iron vessel for the above-mentioned purpose, either cylindrical or spheroidal; in one case, double protectors are used, and, in another instance, the vessel is made up of separately-coiled staves.

In the mechanical arrangement, the vessel has teeth on its periphery, which gear into a pinion "operated by any suitable
"mechanism."

[Printed, 10d. Drawing.]

A.D. 1866, November 6.—N° 2870.

WALKER, THOMAS.—(*Provisional Protection only.*) "Improve-
"ments in the construction of electric telegraph cables, lines, and "transmitting instruments connected therewith."

1st. Cables.—Naked conductors, either connected to earth plates or to the instruments, are used for the return current. In a second plan, a cable is made with two conductors, which are formed into a strand, one being insulated, the other uninsulated. In another form of cable, two conductors of the same metal are "formed into a strand and kept separate by covering one "of them with any suitable porous material;" "any element of "a dissimilar electrical tension placed in the water" "being "brought into contact with either of the conductors will produce "a current;" this arrangement may be used with the ordinary battery power, attaching the poles to the two conductors.

The shore ends of cables may be protected by casing them "with "a sheathing made in parts, so that when put together it would "form a good flexible covering."

2nd. Land lines.—A strand is made up with two conductors, kept from contact by means of hemp; to preserve the hemp from decay, it may be saturated with boiled oil mixed with resins or gums.

3rd. Transmitting instruments.—"Using levers or keys, one or "both ends of which may be made to pass over surfaces partly "insulated to make or break contact or reverse currents as re-"quired to produce letters, words, or other signs by the needle, "electro-chemical, electro-magnetic, or any other system to "which it could be applied."

[Printed, 4*d*. No Drawings.]

A.D. 1866, November 6.—N° 2880.

SPAGNOLETTI, CHARLES ERNESTO.—"Improvements in "arranging and combining apparatus for communicating between "the guard, engine driver, and passengers in a railway train."

Electric contacts, or couplings, between the carriages.—The insulated wires "are joined between each carriage by means of "iron bars, pieces of metal cable, or connecting rods;" "the act "of coupling up the carriages makes the electrical connections." For additional means of contact, side springs, an electric cable with a hook and eye, or half balls of brass, fitted to the buffers by means of springs, may be employed.

Apparatus to be fixed in each carriage compartment.—A handle is in connection with an iron rod, at the end of which, outside the carriage, is fixed a signal plate edgeways to the line of sight when in its normal position, but facing the guard when the handle is turned. The turning of the handle also rings bells in each guard's van; after the handle has been turned, it can only be replaced by the guard.

On the engine is placed a bell-disc instrument and a battery; the disc instrument shows a signal "Stop," or "Stop at next "station." "Each van is provided with a bell, battery, key, and "switch;" the latter instrument is to adapt the van to its position in the train. A box containing the guard's apparatus may be removeable. The imperfect coupling of the train causes a bar to make an earth connection.

Light signals, fog signals, and a means of securing the guard whilst he walks along the footboard of a train in motion, are also set forth.

[Printed, 4d. No Drawings.]

A.D. 1866, November 7.—N° 2886.

DARLOW, WILLIAM, and SEYMOUR, PHILIP WILLIAM.—"A "new magnetic compound applicable to the manufacture of articles "suitable for curative and other beneficial and useful purposes."

This invention consists in "the production of a magnetic com- "pound or substance composed of a gummy, resinous, bituminous, "or other suitable adhesive substance, with magnetic or mag- "netisable particles incorporated therewith in such a manner as "to adapt it for application to various useful purposes," "such "magnetic compound" "being capable of retaining and imparting "its magnetic influence."

For flesh brushes, India-rubber is incorporated with steel dust, India-rubber or its compounds being used, "owing to the high "electrical qualities of these materials or substances, thereby "combining electrical effects with magnetic action." After the "incorporation of the two elements of the compound it is either "rolled into sheets or moulded into any required shape, and, if "required, then vulcanized." To magnetise the already-shaped material, it may be brought into "contact with an excited electro- "magnet."

In the case of chest protectors, belts, and bandages the compound is applied "in the shape of bar magnets." Pitch or

asphalte is used as the vehicle when the compound is required to be without elasticity.

"This magnetic compound is applicable to horticultural and "agricultural purposes, and when intended to be so applied it "is or may be manufactured in small pieces or globules."

[Printed, 4*d*. No Drawings.]

A.D. 1866, November 7.—N° 2894.

GOODBRAND, WALTER, and HOLLAND, THOMAS ECCLES.—"Certain improvements in apparatus for rendering the security "of safes and other depositories more effectual."

This invention is designed to indicate "burglarious attempts to "open safes," and to give alarm of the same to watchmen. A novel arrangement of mechanism to extinguish a certain gas light, indicates the attempt; the alarm is "given by electrical apparatus "in combination with such mechanism."

In the Provisional Specification the apparatus is described as consisting of a chamber which is supplied with gas from outside the safe, and a glass tube through which the gas passes to a lamp outside the building; "a metal pipe enclosing the glass tube also "is connected to this chamber, the other end of which pipe is "open to the atmosphere." A spindle valve prevents the gas from passing into the atmosphere, as long as the top of its spindle is hooked on to a hinged rod; the said rod is secured to the opposite side of the safe, and is connected with a piston and rod enclosed in a box. When a burglarious attempt dislodges the hook, the released valve covers the aperture of the glass tube and leaves "the gas open to the atmosphere." At the same time, the other end of the valve rod, in falling, completes an electric circuit, releases a detent armature, and causes a clockwork bell to ring for any duration of time.

In the description of the Drawings in the Final Specification, the valve is a slide valve with a vertical rod, and the supply pipe is simply closed by the dropping of the valve, no mention being made of the gas being "open to the atmosphere."

[Printed, 8*d*. Drawing.]

A.D. 1866, November 10.—N° 2932.

LITTLE, GEORGE.—"Improvements in instruments for trans-"mitting telegrams betweem remote places especially adapted for "submarine and subterranean lines of communication."

The receiving apparatus which is the subject of this invention is capable "of being worked by electrical waves of low power "through great distances."

"The apparatus consists of a magnetized steel band or of a "magnetized steel needle" "in combination with" a spherical air float composed of glass, "and provided with two stems or pro-"jecting points, and caused to float in alcoholic spirits" "con-"tained within a tube" of glass, "and so arranged that the "north and south poles of the steel band or equivalent when the "latter is floating in the tube shall be kept in a position for "telegraphic purposes by the polarity of the earth, and the whole "apparatus being also arranged in the inside of horizontal coils "of insulated copper wire in such a manner that when alternate "or reverse currents of voltaic electricity are passed through the "coils," "the poles of the steel band or equivalent will be made "to dip alternately to the north and south poles of the earth, and "will thereby cause the stems of the air chamber or float to "deflect to the right or to the left according as may be desired "for the purpose of indicating dots and dashes."

A double spring key with upper and lower contacts is shown in the Drawings.

A screen with four bars defines the dots and the dashes.

In a modification, the band or needle is supported upon a metallic centre, and has a vertical pointer.

[Printed, 8*d*. Drawing.]

A.D. 1866, November 12.—N° 2953.

INGRAM, James, and STAPFER, Heinrich.—"Improve-"ments in apparatus for testing the lubricity of oils and other "lubricants."

A given quantity of the lubricant to be tested is submitted to frictional action between certain surfaces at a uniform velocity of rotation and a constant external temperature. The number of revolutions necessary to produce a given heat is measured by a registering apparatus. When the heat is attained, the expanded mercury of a thermometer completes an electric circuit, and actuates an electro-magnet, which releases a catch and throws the driving pulley out of gear. The best lubricant registers "the "greatest number of revolutions before arriving at the temperature "fixed upon."

The Drawing shows a drum shaft revolving between corresponding cylindrical concave surfaces that do not revolve with the shaft, but that are pressed against the drum surface by a constant pressure produced by levers and weights. The lubricant is poured in at a spout formed upon the lower half of the concave surface. The above-mentioned thermometer in contact with the upper frictional surface consists of an iron cistern, into which a glass tube is fitted; at the upper end of the said glass tube or stem a wire communicating with a galvanic battery is sealed. A clutch, on the drum axle, has a constant tendency (by the action of a spring) to be forced out of gear with the driving pulley. A bell-crank lever, connected by a rod with the armature of the electro-magnet, however, holds the clutch in gear until the electro-magnet is active; therefore when the desired temperature is attained, the drum shaft stops, and the number of revolutions made may be read off from the registering apparatus.

Other means of stopping the drum shaft are set forth.

[Printed, 8d. Drawing.]

A.D. 1866, November 13.—N° 2972.

CLARK, WILLIAM (*a communication from Rufina Nöggerath-Temmerman.*)—" Improvements in the preparation or treatment of " fabrics or materials for the manufacture of various useful " articles."

This invention relates to a process for hardening or stiffening and metallizing textile fabrics, and other materials, for the manufacture of " baskets, boxes, trays, vases, hand screens, portfolios, " toilet and other such like articles." The materials " are sub- " mitted to a preliminary preparation," hardened, painted, or immersed in a dye, varnished, metallized, subjected to heat, and " dipped in a finishing bath " to gild, silver, or bronze them.

Either open or close fabrics may be employed, and the necessary degree of hardness may be given by a solution of silicate of potassium, or by immersion in a solution of size, resin, " or other " products serving to envelope or enclose the materials." Other hardening agents are chloride of lead, an alcoholic solution of galipot, or a solution containing quicklime and albumen. Immediately after leaving the bath of the hardening agent, the article is moulded. If the article is to be metallized, it is jointly acted upon by nitrate of silver solution, and a solution of phos-

phorus in sulphuret of carbon; instead of this process, other salts that, by chemical combination, precipitate a metal may be used to metallize the article.

"Imitations of gold and silver" may be produced by the dilution of gold and other powders "in white varnish," or by sprinkling the dry powders on the freshly applied varnish.

These and the other metallizing processes may "form con-"ductors of electricity during the metallization of the fabrics or "materials in the galvanoplastic bath."

[Printed, 4d. No Drawings.]

A.D. 1866, November 14.—N° 2977.

PAYNE, Edward John (*a communication from John Haffenden*).—(*Provisional Protection only*.) "An improved mode of authen-"ticating or confirming telegraphic dispatches, and" "apparatus "to be employed therein."

"This invention relates to a method of authenticating telegrams "by the addition of certain letters, by preference three, to each "telegram. These letters are so arranged as to give a different "combination for every day in a period of six months; attached "to each combination is a number, ranging from 1 to 183, which "numbers are arranged in any desired order opposite to the days "of the month, confidential agents supplied with this table are "enabled at once to ascertain whether the telegrams they receive "are forwarded by the correspondent in possession of the coun-"terpart table or key. The apparatus adopted for this purpose "consists of a tablet of wood or other suitable material contain-"ing thirty-one transverse grooves corresponding to the number "of days in the longest month; upon the face of the tablet is "hinged a lid or cover containing six columns of slots arranged "vertically, so that when closed the slots are immediately over "the grooves in the face of the tablet. Each combination of "letters with its corressponding number is cast in a separate "block of metal, or may be printed on paper and attached to "blocks of any suitable material, which when inserted in the "grooves in accordance with a previously determined key will be "seen through the slots in the face plate or cover. The choice "of three letters to be added to each dispatch arises from the "fact that this number is sufficient to form an entirely different "combination for each day of the six months, and they are so "combined that any two of the letters in case of the omission or

" erroneous transposition of the third will still suffice to form a
" combination not to be found elsewhere in the tablet."

[Printed, 4d. No Drawings.]

A.D. 1866, November 17.—N° 3023.

GEDGE, WILLIAM EDWARD (*a communication from Edouard Néel*).—" Certain improvements applied to clocks and to the re-
" ceiving apparatus of telegraphs."

The inventor replaces the hands or indexes of the above apparatus, " after the following manner:—Firstly, the mechanism of
" the clock (or telegraphic apparatus) is not changed, but as many
" moveable dials are fitted as there are indicators to be given, two,
" if it is desired to have only the hours and the minutes, or three
" or a greater number, according to the indications required from
" the clock or chronometer; secondly this moveable dial is placed
" on the axle of the wheel of the hours, minutes, and seconds,
" in such a way that the indication of the minute corresponds
" perfectly with the tooth which establishes this division of the
" minutes; thirdly, the moveable dials are hidden by a screen or
" cover, leaving visible for the hours only the hours correspond-
" ing to the twelfth of the dial, in other words, only one hour
" one minute or one second passes at a time."

" The clockwork which in ordinary clocks causes the hands to
" travel will also advance with equal regularity the dials placed
" on the actual axle of the wheels indicating the hour the
" minute and the second. This modification is applicable to
" telegraphs," " and in this way any person can read the dispatch
" which is addressed to him without any special study the letters
" presenting themselves on the screen, and there being no necessity
" to follow the evolutions of an index."

[Printed, 1s. Drawings.]

A.D. 1866, November 19.—N° 3038.

CLARK, JOSIAH LATIMER.—" Improvements in electric tele-
" graphs."

1st. The iron telegraph posts are made with " wings " or
" arms;" two light iron rods, attached to the bottom of the post, pass over these projections to the top of the pole.

2nd. Rolling the iron poles with two flanges on opposite sides, the bottom of each pole being the strongest. The plates are welded by rollers with peculiar grooves.

3rd. The body of the pole is formed of rivetted wrought-iron plates; the top length is a solid wrought-iron tube.

4th. Asphalt applied to the poles is supported by fibrous materials.

5th. The base of the insulator bracket is of cast iron. The iron or steel arm is cast into the base.

6th. The attachment of the insulators to the supports by means of a metallic, screwed, socket-piece.

7th. The wire is attached to the insulator by means of a cast-iron cap, carrying on its top a "snug." A screw through the snug jams the wire.

8th. Lightning conductors, connected with each insulator, "are "formed of iron rods pointed at their extremities."

9th. Instruments for signalling through long submarine cables consist of a metal ball fixed on an axis and furnished with a handle. The ball, being connected to the line wire, may make momentary contacts with cheeks connected respectively with the battery poles. The spring hammer or ball has a stop on each side.

The receiving instrument consists of a magnetised needle, which is suspended vertically by magnetic induction.

10th. A current that counteracts earth currents is used in connection with one needle; an ordinary needle is also employed. The pencil of light from one serves as a steady zero point from which the motions of the other are reckoned.

[Printed, 1*s*. 2*d*. Drawings.]

A.D. 1866, November 19.—N° 3039.

BAKER, JAMES.—(*Provisional Protection only.*) "Improve-"ments in magnetic engines."

"A number of straight electro-magnets are placed on the cir-"cumference and parallel to the axis of a wheel: these magnets "are arranged into three (or more) sets, and upon the poles of "each a soft iron armature is attached. The polarity of each set "can be reversed." "On each side of this wheel are arranged a "system of fixed permanent or electro-magnets parallel to the "wheel magnets prolonged. On each side of the wheel the fixed "magnets are divided into two (or more) sets, and a soft iron "armature is attached to the poles (nearest the wheel) of each "set. To the outside poles of these fixed magnets a soft iron "armature is attached which unites the opposite poles of both "sets. One set of the fixed magnets has an opposite polarity to

" the other, and their armatures are brought into close proximity " to the armatures of the wheel magnets without actually touch- " ing them." A commutator on the wheel axis, composed of metal rings and having metal rollers, suitably reverses the polarity of each set of wheel electro-magnets. "The wheel magnets are so " magnetized that their armatures are attracted by the armatures " of the fixed magnets until they are opposite to them, the " polarity of the wheel magnets is then reversed and they are " repelled. In the sets of magnets similar poles are applied to " each armature, so that an armature represents the single pole of " a magnet." Secondary currents from the wheel magnets may be applied to magnetise the fixed magnets.

The steel for permanent magnets may be applied, white hot, to an electro-magnet and allowed to cool in that position.

Thermo-electric currents are preferably used to drive this engine.

[Printed, 4d. No Drawings.]

A.D. 1866, November 20.—N° 3047.

BROOMAN, Clinton Edgcumbe (*a communication from Mayeul Bernabé*).—" A new or improved process or method of coating or " covering iron and steel with copper or copper alloys."

In the process treated of in this invention, three distinct operations are employed, viz., cleansing, electro-coating in a bath of cyanide of potossium, and strengthening the coating by means of an electro-deposit in a bath of sulphate of copper.

The cleansing is accomplished by immersion in a weak solution of sulphuric acid, rinsing, and rubbing with sand and water rendered alkaline by carbonate of sodium.

The electro-depositing alkaline bath consists of carbonate of copper dissolved in cyanide of potassium. In the case of brass and bronze, zinc and tin respectively enter into the composition of the bath. A modified Bunsen battery supplies the electric current, the number of cells being in proportion to the intensity required.

The bath of sulphate of copper is a saturated solution of that salt. This electro-depositing solution may be worked by a porous cell arrangement, in which the saturation of the bath is ensured by a fresh supply of solution, and by means of bags of crystals. The diaphragms may be of sail cloth or of porous earthenware.

A saving of electric power can be effected by using the electric current of the second bath to work the first bath.

[Printed, 4d. No Drawings.]

A.D. 1866, November 24.—N° 3089.

FUNNELL, EDWARD.—(*Provisional Protection only.*) "Im-
"provements in electric signals for use on railways."

"The object of this invention being the increased certainty in "the locking and unlocking of a signal arm, which consists in "the application of an endless screw axle and fly wheel, by which "the extended position of the signal is retained during the pas-"sage of trains or thunderstorms, and also the application of a "star wheel with connecting points by which the electric current "is passed for the unlocking of the signal arm to show line clear "at the required distance."

The mechanical arrangement for raising the signal arm consists of a treadle, horizontal lever (on the treadle axis), and pulling wire. The wire is attached to the arm and, through "spiral" springs, to the lever; the other extremity of the lever carries a catch, which is risen up to the top of the vertical endless screw by the passage of the train, and at the same time removes a rod from the catch of the fly wheel. After the treadle for releasing the signal arm is depressed by the engine, its lever is again pulled down by a reaction spring, moving the said star wheel one tooth, and thus establishing a momentary electric current, which releases the fly wheel of the apparatus at the signal arm, and restores the said signal arm to its normal position; at the same time the catch rod is raised.

The upward movement of the lever of the releasing apparatus does not effect the position of the star wheel, owing to the spring mounting of the catch; and a train of wheels and click, connected with the lever axis and with the escape pallets of a pendulum, prevent two electric contacts from being made by the passage of one train.

[Printed, 6d. Drawing.]

A.D. 1866, November 24.—N° 3094.

JONES, RICHARD BOULTON.—"Improvements in apparatus for "transmitting & recording messages or signals."

This invention relates to those receiving instruments that record the signals by marking a series of dots and lines upon a strip of paper that is unwound by clockwork, and the marker of which is depressed at suitable intervals and for suitable periods by the line-wire electro-magnet.

The invention consists of a "self-supplying pen," which is fed, as the marking proceeds, with fluid ink; it also consists of a method of "putting out of action the pen or writing instru-"ment."

The reservoir containing the ink communicates (by means of a pipe) with the hollow stud pin that forms "the fulcrum of the "lever, from which the writing pen depends." The hollow stud pin acts as a single-way stop cock, of which the boss of the lever arm is the shell or casing. The writing lever is connected with the armature lever by means of its forked end. The supply of the ink to the pen is through the arm that connects it to the said boss; it is adjustable by means of a "middle cylindrical casing" that is furnished with a hand lever. The passage of the ink to the pen can only take place when it is moved downwards.

When the lever that stops the clockwork is in use for that purpose, it also causes a lever to throw a stop over the armature lever, which, nevertheless permits "of a slight motion thereof sufficient "to call the attention of the operator without marking the "paper."

[Printed, 10*d*. Drawing.]

A.D. 1866, November 26.—N° 3113.

COURTENAY, Robert Henelade.—(*Provisional Protection only.*) "Improvements in the preparation of printing surfaces "by the aid of photography."

Engraved metal plates are produced by this invention.

A photographic print is first taken from the photographic negative "on to a transfer paper prepared with a solution of gelatine, "sugar, albumen, bichromate of potash, or ammonia, or both in "combination with a quantity of bichloride of mercury and "hyposulphite of soda." The print is inked with transfer ink; sponged, dried, and transferred to the metal plate to be engraved. This plate is of thin copper, soldered at the back to a thicker plate of zinc, and the copper is electro-coated with zinc on its face, the zinc face receiving the transfer. The plate, thus prepared, is "etched with nutgalls," and the transfer ink is cleaned off; the plate is now inked up and protected at the back with varnish. The zinc that is uncovered with ink is removed by means of a weak acid solution.

The plate is electro-etched in an alkaline solution, three separate etchings being made, the previous one in each case being first pre-

tected with varnish in the finer parts; the fine work, the medium tints, and the broad lights are thus obtained. The plate is then cleaned, and is ready for printing from in the ordinary manner of type printing.

To produce an intaglio plate an electrotype is taken from a plate treated in a somewhat similar manner to that described above for type printing.

[Printed, 4d. No Drawings.]

A.D. 1866, November 27.—Nº 3124. (* *)

CLARK, WILLIAM (*a communication from Jules Henry Delaunay*).—" Improvements in the means and apparatus for indicating the " time and distance travelled by vehicles," or " the number of " revolutions of any kind of rotary machinery."

A magneto-electric machine, the coiled armatures of which are fixed to the top of one of the rear wheels of the vehicle, send one current at each revolution of the wheel to the electro-magnet of the indicating apparatus.

The indicator " consists of an ordinary clockwork action with " a cylinder escapement actuated by the electric current produced " by the apparatus before described, and conducted by means of " two insulated wires. The number of intermissions or revolu- " tions of the wheel is transformed into miles by means of suit- " able wheel gearing, and indicated on dial plates." One dial is visible to the passenger, " and is furnished with a disconnection " similar to those of printing telegraph receiving apparatus, by " which means the index returns to zero at the commencement of " each journey." The index of the proprietor's dial plate is " mounted on the same spindle as the former," " and has no dis- " connector, consequently it indicates the whole number of miles " travelled in a day." When the vehicle is unoccupied the placing of a tablet marked "for hire" by the driver breaks the electric circuit, and stops the action of the indicator; the lowering of the tablet to the right hand sets in motion the mile-indicating apparatus, to the left hand it prevents the action of the said mile-indicating apparatus, " but at this moment a horary indicator with " two dials commences to act, one of these dials, which is fur- " nished with a suitable disconnector, reckons the hours occupied " by each journey," the other dial reckons the whole time occupied in the journeys. The fares may be fixed according to a certain algebraical formula.

In another arrangement the wheel rotates a keeper before the coiled piles of the fixed permanent magnet.

[Printed, 1s. 8d. Drawings.]

A.D. 1866, November 27.—N° 3125.

GEORGE, RICHARD.—(*Provisional Protection only.*) "Improve-
" ments in machinery or apparatus for obtaining motive power."

"This invention relates to certain improvements in that class
" of engines in which motive power is obtained by the force of
" steam, or by the rarefaction and expansion of air caused by
" the combustion of inflammable gases or vapours, acting upon a
" piston traversing to and fro within an oscillating or vibrating
" cylinder."

"The electric 'igniter'" is used to explode "the mixture of
" atmospheric air and gas or vapour" within the cylinder. Into the hollow portion of a hollow metal plug a non-conducting material is fixed, within which are placed the two poles of the battery. An insulated "pointer" is fixed to the crank shaft of the engine, and "revolves against a circular piece of metal
" charged with electricity from the positive pole of the battery," giving off electricity to other parts of circular metallic plates which are in connection with the igniters placed in the respective ends of the cylinder.

According to another method of transmitting the electricity, a
" pointer" is fixed to the cylinder and oscillates therewith. "The
" 'pointer' is made to come in contact with a piece of metal
" which is charged with electricity from the positive pole of the
" battery. During the oscillation of the 'pointer' it gives off its
" electricity to two shorter pieces of metal, and which last-
" mentioned pieces of metal communicate respectively with the
" 'igniters' at each end of the cylinder, thus emitting a spark
" inside each end of the latter alternately, and when required."

[Printed, 4d. No Drawings.]

A.D. 1866, December 3.—N° 3169.

MENNONS, MARC ANTOINE FRANÇOIS (*a communication from Juan Amann*).—" An improved apparatus for the automatical
" performance of music on pianos, organs, and other keyed instru-
" ments of like description."

This invention consists of electro-magnetic apparatus, "by
" aid of which musical compositions, represented by perforated or

" other conducting spaces in continuous bands of suitable insu-
" lating material, may be executed on pianos," &c. " without the
" intervention of a skilled performer."

Induction coils are mounted in double ranges, above the key-board, in such a manner that each pair corresponds with one of the keys. Vertical metallic rods convey the motion of the keeper of each electro-magnet to its key. A " wooden plate " is placed over the key-board, the said wooden plate being provided with a hinged metallic bar and metallic springs, " each communicating " with the wire of one of the external coils ; " the perforated or metallised sheet of music is drawn between the hinged metallic bar and the springs by means of certain caoutchouc cylinders actuated by a hand winch and spur-wheel gear.

To perform on the instrument, the hinged metallic bar is thrown back to admit the sheet of music, the blank extremity of which is caught by the caoutchouc cylinders. The bar is secured, the cylinders are revolved, and the instrument is operated according to the electro-magnets brought into circuit by the perforations in the paper.

For brilliant or " forte " passages, two other batteries are brought into circuit, and are made to excite the electro-magnets of both ranges by means of certain electro-magnets that are brought into action by especial lines reserved for them on the sheet of music.

[Printed, 1s. Drawings.]

A.D. 1866, December 4.—N° 3191.

HICKLING, William Edwin.—(*Provisional Protection only.*)

" Improvements in machinery or apparatus for the prevention of
" collisions and other accidents on railways, and for generally
" promoting increased safety in railway travelling."

By this invention, a given train is prevented from coming into contact with a train that is already stopped, or the said given train is prevented from arriving at any place of danger. The machinery may register the time of passing of the last train, or it may be made to telegraph the exact position of the train, either backwards or forwards. This is done " by making and breaking contact of
" an electric current alternately for magnetizing and demagne-
" tizing two electro-magnets which shall actuate a ratchet wheel
" showing on the face of a dial placed in the station-master's
" office the number of times contact has been broken, and thereby
" shewing the precise position of the train."

In an example of the machinery used, lever mechanism is placed at about 800 yards asunder, between the lines of rail. By means of certain inclined pieces of metal, a frame (fitted to the last carriage of a train) acts upon one of the levers to raise another long lever that is retained by a notched bar. At the next-but-one apparatus (when the train arrives), a wire disengages the long lever of the first-mentioned apparatus, leaving the line clear for the next train; this occurs with each next-but-one apparatus in succession. When, however, a train comes into contact with a raised lever, the engine is reversed, and the brakes are operated upon by self-acting means.

[Printed, 4*d*. No Drawings.]

A.D. 1866, December 4.—N° 3192.

MARSHALL, William Alfred.—(*Provisional Protection only.*)

" Improvements in insulating and protecting electric telegraph " wires, and in the means or apparatus employed therein."

Each of the said wires, whether previously coated or not, is coiled with a suitable non-conducting fibrous substance, with an interval between each coil, and is coated with " paraffine wax " whilst that substance is in a liquid state so as to saturate the " fibrous coating therewith and fill up the intervals. There may " be two or more successive coils of the fibrous material laid one " over the other, each succeeding coil being laid in a direction " opposite to that preceding; a wire or a series of them so prepared " is then surrounded by the tube of lead or other suitable similar " soft metal by that tube being formed thereon in a fluid or semi- " fluid state, and the metal tube so formed to enclose the wires is " prevented from coming into immediate contact with the paraffine " wax at and for a short time after the point of formation by the " use of an intervening tube or triblet whilst the paraffine wax is " kept sufficiently liquid to flow into and fill up the space between " the wires and the metal tube."

The apparatus that effects the above-described process has a reservoir that holds the paraffine wax, at the bottom of which the prepared wire passes and takes with it a sufficient quantity of wax. At about this point the molten or semi-fluid soft metal is permitted to flow under pressure, being prevented from immediate contact with the wire by means of the above-mentioned tubular triblet or mandril.

[Printed, 4*d*. No Drawings.]

A.D. 1866, December 5.—N° 3201.

SWEARS, Henry Finch.—"Improvements in the means of "communication between stations and railway trains in motion, "and between passengers, guards, and engine driver."

A metal rod or wire is placed continuously, or otherwise, along a railway parallel with the rails, on insulated supports. A roller at the extremity of an arm that projects from a carriage in the train, makes electrical communication between the said rod and the train; the roller is pivoted on an axle at the end of the arm.

Instead of the roller being mounted on an axle, it may be mounted in a frame; when the rollers (if there are more than one) are off the rod, they hang in bearings in the frame.

Instead of wheels, brushes or balls may complete the contact.

By another plan, the end of the arm may be furnished with a spring or loose joint.

Another plan consists in using a flexible wire-work attached to a frame in connection with the arm.

A telegraph wire may be fixed to the ordinary posts, and brought to the rails as often as may be necessary.

A loose wire under the carriage may come into contact with the wire parallel with the rails.

The second part of the invention consists of a means of attracting the attention of the guard or engine driver by the passengers. This is done by a drum that contains chambers like a revolving pistol; detonating signals are fixed round the periphery of the drum; the charges are fired by being struck by bolts. Each time a handle is pulled a signal explodes, and the drum presents a fresh signal ready for the next occasion. When the handle is pulled a fan is released and the cord is pulled out of the handle.

Many details are set forth in this Specification.

[Printed, 10*d*. Drawing.]

A.D. 1866, December 6.—N° 3209.

WILDE, Henry.—(*Provisional Protection only.*) "Improve-"ments in electro-magnetic and magneto-electric machines."

1st. "An improved method of producing electricity from electro-"magnetic machines."—A wrought-iron disc carries an even number of cylindrical bars, arranged at equal distances in the circumference of the circle on the centre of which the disc is pivoted, the bars being parallel to the axis of the disc. The bars

form the cores of electro-magnets "having alternately north and "south poles." Two of these compound electro-magnets are mounted "with the centres of the discs in the same straight line." The bars of one disc have poles opposite to those of the other disc, the said opposite poles being of different names; "between these "two circles of electro-magnets a wheel is made to revolve con-"centrically with the axes of the discs, and on the periphery of "this wheel are fixed as many electro-helices with iron cores as "there are cylindrical bars on one of the discs." When the compound electro-magnets are excited by means of a magneto-electric machine, and the electro-helices are revolved by means of a motive power, alternating currents are produced.

2nd. "An improved method of arranging the commutators of "magneto-electric or electro-magnetic machines."—The commutator "inverts the current twice only during one revolution." A pinion, on the commutator spindle, is driven by a toothed wheel on the axle of the helices, the number of teeth on the wheel being proportioned to those on the pinion, so "that the commutator "changes the direction of the current" as many times as the magnetism of the electro-helices is inverted during one revolution of the wheel.

A flat commutator, with surfaces sliding over one another, may be used, reciprocating motion being imparted thereto.

[Printed, 4d. No Drawings.]

A.D. 1866, December 6.—N° 3224.

CLARK, WILLIAM (*a communication from Eloi Poitevin*).—(*Provisional Protection only.*) "Improvements in electro-magnetic "apparatus for obtaining motive power."

This "motor" is "more especially applicable to small vehicles "and boats."

In an "apparatus with one electro-magnet and one armature," "the armature is fixed on a lever," "the final purpose of which "is actuate the ratchet on the wheel. A plain efficient inter-"rupter of the current is fastened by soldering or otherwise on "the lever." The bichromate of potassium battery is small, and is carried on the vehicle or boat. The poles of the electro-magnet are placed horizontally and act upon an oscillating armature, the lever of which operates the said ratchet lever through the intervention of a "crank" [connecting rod?]; the centre of oscillation

of the ratchet lever is also the centre of the ratchet wheel, and of the driving shaft of the vehicle or boat. As soon as the armature is attracted, the electric current is interrupted by means of a spring attached to the armature, a contact screw being at that moment left by the spring; the armature is brought away from the electro-magnet, and contact is re-established by means of an "antagonistic "spring," which acts upon a fixed stud on the armature lever; these alternate actions drive the vehicle or boat.

In another arrangement (involving the use of "a large electro-"magnet") the armature carries the ratchet or click, oscillates from the centre of the driving wheel, and is drawn away from the electro-magnet by its own weight. On dropping down, it (the armature) completes the circuit by means of an insulated metallic fork, the prongs of which dip into mercury cups.

To prevent the retarding effects of the residual magnetism, the armature may be magnetised inversely by a derived current or by "a small special pile."

Attention to proportions and to relative strength of springs is necessary to the success of the invention.

[Printed, 8*d.* Drawing.]

A.D. 1866, December 13.—N° 3278.

PEPPER, JOHN HENRY, and PICHLER, SERAPHICUS FRANCIS.—(*Provisional Protection only.*) "Improved apparatus and auto-"matic figures capable of performing various gymnastic feats."

One automaton performs gymnastic feats similar to those that are accomplished "by athletes on a swing or instrument known "as the trapèze." In this instance the apparatus employed is entirely mechanical.

"We also according to our invention construct a skating "automaton. On a large sheet of brass or other material we "place a figure with iron skates, and underneath the plates are "magnets, which by attracting the skates keep the figure in an "upright position, and as the magnets are moved about by suit-"able mechanism the figure follows the motions of the magnets, "and in this way the evolutions of a skater are imitated.

"By similar mechanism an automaton may be made to walk "on the under side of a ceiling or other surface."

A mechanical means of causing an automaton to walk on a tight rope is also described.

[Printed, 4*d.* No Drawings.]

A.D. 1866, December 13.—N° 3281.

ADLEY, CHARLES COLES.—"Improvements in the construction "of telegraph standards and insulators."

1st. Telegraph standards.—The upper ends of two inclined struts "are brought together and secured by bolts or rivets, whilst "their lower ends are connected together by a tie bar, and fitted "with base plates to make the standard fast in the ground. "Diagonal bars are also used for bracing the inclined struts "together. The base or spur plates may carry supplementary "struts to resist excessive or exceptional strain in the direction of "the line wire. The standards may be constructed of wood or "iron, and their structure will be on the principle of the braced "girder. When constructing them of iron the main struts may "be formed either of T iron or of two bars of angle iron rivetted "together. In the latter case the ends of the diagonal bracing "bars will be clipped between the angle iron bars." The Drawings show various examples of standards constructed as set forth above, with either a single or a double set of ties, and with "supplementary struts."

2nd. Insulators.—"The insulator, which is usually cup shaped," is formed "with double (two concentric) lips, or rather with an "annular recess in its under surface, taking care however, that "the edge of the inner lip or shield does not dip below or materially below the outer one. The confined space between the two "concentric lips will arrest the splashed rain, and secure a dry "inner surface for the outer lip." Several forms of insulator are shown in the Drawings; in one form an "auxiliary" shield is employed.

[Printed, 10d. Drawing.]

A.D. 1866, December 14.—N° 3287.

HOSKING, ALBERT WHITFORD.—(*Provisional Protection only.*) "Certain improvements in facilitating communication "between passengers and guard on railways."

This invention is designed to enable the guard in charge of a railway train to call the attention of the passengers, for the production of their tickets, and thereby to facilitate the collection of the tickets.

"The improvements consist in providing each carriage of a

"train with tablets containing directions for passengers such as "'prepare tickets for collector,' which are covered by flaps or "screens, and applying an insulated electric wire and current to "such flap so as to uncover the tablet by breaking the electrical "contact and allowing the screens to fall, and at the same time "to ring an electric bell behind the tablet, and by means of a "second wire not connected with the bells, but with a stronger "battery and electro-magnets the screens are replaced over the "tablets when the train moves on. The electrical current is to "be transmitted from the guard's van, and carried through the "train by an insulated wire, and the connection may be made by "attaching the wire to the chain couplings; or where gas is used "on trains, or by connecting the wire with the gas pipe couplings. "The bells may be enclosed in a glass case (or covered by a glass "plate), on which the information desired to be conveyed to the "passengers is inscribed; or the bell may be enclosed in a box "with an opaque front having the information inscribed on the "surface thereof."

[Printed, 4*d*. No Drawings.]

A.D. 1866, December 15.—N° 3298.

GILLARD, JOSEPH PIERRE.—"Improvements in apparatus for "attracting, exciting, and distributing in various directions rapid "successions of electric currents derived from the voltaic pile or "other electric apparatus."

This apparatus (called the "electro-polyphore") is said to increase "the intensity, tension, or strength of an electric current "derived from any suitable generator of dynamic electricity."

"A rapid revolving motion is imparted to one or more arbors, "each of them carrying fixed to them a serie or series of pairs "of metal blades or one or more pairs of metal discs, between "each pair of which is situated a coil of insulated metal wire "receiving the electric current from a galvanic battery," "the "discs conveying the current at extremely rapid intervals to a "series of conductors fixed round the periphery of the said discs "in the inner periphery of an enveloping drum, and so as to give "rise to a rapid succession of alternate breakings and closings "or formings of the electric circuit."

The Drawings show an apparatus, as described above, with two arbors, one connected to the positive the other to the negative

battery pole; the enveloping drum of each arbor, therefore, gives out positive and negative electricity respectively. It is preferred to construct the coil of each drum with two wires; one wire of the first coil connects the battery pole with a cross stay, and the other connects the cross stay with the opposite cross stay; in the second coil both wires connect the battery pole with the periphery of the discs. Spring rollers convey the current to the poles of the galvanometer or other means of utilising the electric power.

[Printed, 8*d*. Drawing.]

A.D. 1866, December 20.—N° 3351.

BAKER, JAMES. — (*Provisional Protection only*.) "Improvements in thermo-electric and magnetic apparatus."

These "improvements relate to the production of electric currents by the application of heat to metals or their alloys, to the conduction, insulation, and intensification of those currents, and to their application in producing motive power, part of these improvements being applicable to electric currents produced in other ways."

Such bars are made with longitudinal grooves, the end of a conducting wire being cast into them near their heated extremities. The wires (insulated by pipe-clay tubes) and the said bars are arranged side by side, the conducting wire from one bar being soldered to the opposite extremity of another bar; by this means thermo-electric batteries are formed. The heat may be supplied either by "jets of gas mixed with air" or by heated plates; when the temperature of the plates rises too high, steam is made to damp the fire. To intensify and collect the currents, an electro-magnet is used that has a coil with a compound conductor. By means of a commutator (consisting of a fixed disc or cylinder) having a rotating spring or roller, the currents are collected and conveyed to the apparatus that is to be acted upon by them, the roller making contact with the next conducting portion of the cylinder before it leaves the previous one.

When the said currents are applied to the production of motive power, electro-magnets mounted on a rotating disc are alternately polarized by a suitable commutator, so as to be reacted upon by fixed electro- or permanent magnets, and thus produce mechanical motion; the commutator is like that described above for collecting the electric currents.

In making electro-magnets, the compressed steel is heated and placed within a coil, with the ends of the said steel applied to the poles of electro-magnets, and allowed to cool in a position parallel to the magnetic meridian.

[Printed, 4d. No Drawings.]

A.D. 1866, December 24.—N° 3394.

VARLEY, Cornelius, and VARLEY, Samuel Alfred.—(*Provisional Protection only.*) "Improvements in the means and "apparatus for generating electricity."

The electricity is developed either "by mechanical force alone, "or by mechanical force in combination with chemical action."

Two bobbins, equidistantly mounted upon an axle, revolve between the poles of opposite electro-magnets. Before using the apparatus, an electric current, passed through the coils of the electro-magnets, secures a small amount of permanent magnetism to their cores. A commutator, on the bobbin axle, turns all the weak electric currents that are excited in the bobbins in the same direction and sends them through the coils of the electro-magnets, "forming the whole into one electric circuit," and "causing the "circulation of increasing quantities of electricity."

"To prolong the contact between the bobbins and the poles of "the electro-magnets," the said poles may be armed with soft-iron "horns." This apparatus is called a "magnetic multiplier."

In some cases, one iron bobbin oscillates between the poles of two electro-magnets.

To work telegraphic apparatus, permanent bar magnets are connected as horseshoe magnets and the iron bobbin is removed from between the poles of the compound permanent magnet to produce a definite current. This current may be prolonged by causing the bobbin to pass between the poles of a second compound magnet, "the north pole of the one" being "opposite the "south pole of the other."

"The magnetic multiplier may be used in conjunction with a "galvanic battery," which brings it into action more quickly.

In batteries, groups of cells have the acid flowing through them.

The circuit of the "magnetic multiplier" may be completed "with a large electro-magnet;" this acts as a "fly wheel" to the machine.

[Printed, 4d. No Drawings.]

A.D. 1866, December 28.—N° 3403.

ABEL, Charles Denton (*a communication from John Francis Bennett*).—(*Provisional Protection only.*) "New or improved "means for the prevention of 'rot' in potatoes and grapes, and "the similar blight in trees, fruits, vegetables, insects, and "animals."

The inventor attributes the cause of the aforesaid diseases to "more or less minute discharges of electricity, or, as it may be "termed, small strokes of lightning, not necessarily occuring "during an actual thunderstorm accompanied by flashes of "lightning, but rather under that atmospheric condition which "produces the same."

"The present invention consists in preventing the said dis-"charges of electricity from taking effect by the use at the "localities where the plants and other objects to be protected "are situated of metallic rods or conductors placed at suitable "distances apart, and of a proper height above the ground, which "will vary according to the nature of the crop, plant, tree, or "living object to be protected, such height being by preference "about one and a half times that of the plant or other object, "while the distance apart of the conductors should be about "equal to their height. For this purpose it is proposed to use "straight rods of wire, say three-eights of an inch in thickness, "made of iron, copper, or iron coated with copper, and having "pointed tops. Where grape vines are trained to wire trellises, "these rods may be attached to the wires, or the vine may be "supported upon copper coated iron stakes having arms attached "for conducting away the electricity."

[Printed, 4*d*. No Drawings.]

SUPPLEMENT.

A.D. 1793, April 1.—N° 1944.

GULLETT, Christopher. — " A safe means and beneficial " remedy for expelling the gout from the head, stomach, and " vital parts of persons so afflicted, assuaging the paroxysms " even in the most dangerous cases, and afterwards curing " such, as well as other gouty persons, without any medicine, " plaister, or other such application whatever, either internal or " external."

This invention consists of " the use and application of lightning " (otherwise called electrical fluid or electricity) " to the aforesaid purposes.

1st. " For expelling the gout from the head and stomach." A complete electrical circuit is made, which passes through the affected parts, the prime conductor being electrically connected to the patient's head, and the cushion or rubber of the electric machine being electrically connected " to the patient's breast " where the greatest pain is." In this case the cushion is insulated by a glass stem.

2nd. In cases of the head only, the current is passed from one side of the head to the other.

3rd. In cases of the stomach only, the current enters at the neck and back, and is drawn off at the breast.

4th. When the hands or feet are affected, the current enters at one hand or foot and departs at the other.

5th. Every operation is finished by passing the current from the head to below the knees.

6th. To dissipate chalk stones, enlarged joints, &c., the current is passed through the affected parts.

In all cases the patient may be insulated.

A powerful conductor consists of a nest of conductors, one within the other.

[Printed, 6d. Drawing. See Rolls Chapel Reports, 6th Report, p. 187.]

A.D. 1794, September 30.—N° 2013. (* *)

YELDALL, ANTHONY.—" An acromatic belt which, being ap-
" plied to the human body, has effected most singular cures in
" gouty, rheumatic, and other cases."

"The belt," is described as "a metallic and chymical composi-
" tion, acromatically prepared for emitting as much magnetic
" effluvia as is possible." The nature of the metallic and chemical preparation is not stated.

[Printed 4d. No Drawings. See Rolls Chapel Reports, 6th Report, p. 188.]

A.D. 1805, May 18.—N° 2849.

HOBSON, CHARLES, SYLVESTER, CHARLES, and MOORHOUSE, JOHN.—" A method of sheathing ships, roofing houses,
" and lining water spouts with a material not theretofore used
" for those purposes."

"The material made use of for the purposes aforesaid is the
" metal called zinc, otherwise spelter, and such metal is cast into
" ingots, bars, or pieces of any convenient size, shape, or figure,
" after which the same is to be rolled between rollers, so as to
" convert it into plates of any required thickness."

"And it is hereby declared, that the best general rule or in-
" struction for applying metals as fastenings for zinc or spelter
" sheathing, or for ships so intended to be sheathed, is to take
" that metal which is nearest *in that power which chemists call*
" *galvanism* to zinc or spelter itself, and causes the least quantity
" of oxydation when made with zinc or spelter into a galvanic
" pill" [pile?]. "Iron and tin are metals of this description,
" and those among metals in general are to be preferred of which
" a piece being laid in salt water, in contact with a piece of zinc
" or spelter, is found to produce the smallest change in the zinc
" or spelter in any given time. The sheets of zinc or spelter for
" roofing of houses, or lining of spouts, are to be manufactured,
" annealed, and fastened in the same manner and with the same
" materials; or otherwise, when it's thought needfull to fasten
" the plates more closely to each other, the same may be done by
" a solder composed of tin and zinc or spelter, or a solder of tin
" and lead, similar to that used by plumbers and other artists
" under the name of soft solder."

[Printed, 4d. No Drawings, See Repertory of Arts, vol. 9 (*second series*), p. 251; and Rolls Chapel Reports, 7th Report, p. 190.]

A.D. 1813, November 20.—N° 3751. (* *)

OPE, William.—"An instrument or instruments to be used jointly or separately for ascertaining a ship's way at sea and assisting in determining the longitude."

1st. "The marine automaton."—This instrument consists of a harnessed" magnet; clockwork; reservoirs for mercury; an index to shew the miles and tenths by the rise of the mercury" a "small glass tube;" a "pump to force up the fluid" "to the reservoir;" a "dial to shew the rate at all times by inspection;" a log; "springs or weights to counteract the log;" rack, chain, pinion, and wheel, that (by means of a plate) open ifices of tubes "to let down a fit quantity of fluid;" and other nor but necessary adjuncts. "The mercury falls on the harness of the magnet into a groove which conveys it to lower grooves" "which then conveys it into divisions answerable to the points of the compass."

2nd. "The current log."—The uppermost part "is to be set to a right angle" "when the log is let into the water." An index, sels, stop spring, frame, temporary weights, and compass box h accessaries constitute the apparatus. The "current log" is be put into the water, the line veered out and its end held in hand until a check is felt; "a compass card" is then applied o know the course" and the log drawn up; the index shows rate per hour. A method of graduating the index is described shown. The "steering card" used by preference has a dle which "is both horizontal and dipping."

[Printed, 1s. 4d. Drawings. See Repertory of Arts, vol. 24 (*second series*), p. 265].

A.D. 1813, November 29.—N° 3761.

AGG, John.—This invention relates to "the facing of exerior and interior walls of gothic or other structures built of brick;" also to "capping buttresses in gothic architecture, with highly enriched pinnacles of cast iron only, the which being connected by metal, with the spouts also of metal, and carried down to the ground from" [form ?] "*conductors for the protection of lofty buildings from the effects of lightning.*" A piral" staircase is also set forth.

The pinnacles are cast hollow, and have a projecting moulding the base, in which is a groove which catches the top of the

"buttress, and is there fixed in the firmest and simplest manner." "From the bottom of the pinnacle of cast iron I connect a rod "of wrought iron, which I rivet into the projecting moulding (at "the back, so as not to appear), and carry the said rod to the "spout and attach it thereunto in the same manner, which spout "being also of metal, and carried down into the earth, serves as "a conductor to protect the edifice from the effects of lightning, "without additional expence or labor."

[Printed, 6d. Drawing. See Repertory of Arts, vol. 46 (*second series*), p. 74; also Rolls Chapel Reports, 8th Report, p. 100.]

A.D. 1833, September 21.—N° 6473. (* *)

COURNIER, Louis.—"An improvement in curing certain "maladies of the head." This "consists of an instrument by "which the electric fluid is withdrawn from the head." The instrument is constructed as follows:—A glass vase or box, two inches square, one and a half inches deep, and open at top with a small hole in the centre of the bottom, has fitting the bottom of this box or vase a square piece of cork in which "are thirty-six "steel points or needles projecting from the bottom towards and "nearly to the top of the box or vase, the two sides of the cork "being covered with a thin sheet of foil of lead. From the sur-"face from which the needles protrude a metallic thread or wire "is attached, and passing over to the back passes through the "hole perforated at the bottom of the glass box or vase, and is "sufficiently long to lie on the ground at the time the instrument "is to be tied on to the forehead when intended to relieve the "headache, with the open part of the box or vase and the points "or needles facing the part affected." "Two or more instru-"ments attached together and applied to the head will more "powerfully operate on the patient."

[Printed, 4d. No Drawings. See London Journal (*Newton's*), vol. 7 (*conjoined series*), p. 96.]

A.D. 1840, August 15.—N° 8604.

FONTAINEMOREAU, Pierre Armand le Comte de (*a communication*).—"Certain improvements in covering and coating "metals and alloys of metals."

1st. "Covering or coating with gold."—The articles to be coated are first cleansed, brushed, dried, coloured, washed, dried, scratch-brushed, and burnished; if the articles are of silver, as

soon as they are white they are rubbed with wet sand, washed, and dried. After the cleansing process, the articles are dipped into a bath containing either bromide, chloride, or iodide of gold. When articles of silver are to be coated by means of the "first "bath," "*they must be covered with a copper wire, or they will not "gild;*" the "first bath" contains barytes and strontia besides the above-mentioned salt of gold. Four other baths are described, which are used merely as dipping baths, and for the use of which no copper wire is mentioned as being necessary to the success of the operation.

[The action of the copper wire is clearly to make the article to be coated electro-negative.]

2nd. "Covering or coating metals and their alloys with silver." —After being cleansed, as above, the articles are immersed in a dipping solution composed of nitrate of silver dissolved in chloride of barium, to which "boric" [boracic ?] acid is afterwards added; the following chlorides may be used instead of the chloride of barium :—The chlorides of sodium, strontium, lime, magnesium, or zinc.

3rd. Coating with platinum.—The dipping solution consists of chloride or bromide of platinum and chloride of barium; either of the following chlorides can be used instead of the chloride of barium :—The chlorides of strontium, lime, magnesium, zinc, or ammonium.

[Printed, 4*d*. No Drawings. See Mechanics' Magazine, vol. 34, p. 175; also Inventors' Advocate, vol. 4, p. 132.]

A.D. 1841, February 8.—N° 8842.

TALBOT, WILLIAM HENRY FOX.—"Improvements in obtaining pictures, or representations of objects."

1st. The photographic process known as the "calotype" process.—The preparation of the paper, the use of the paper, and the fixing processes are described in detail.

2nd. "A mode of obtaining positive photographic pictures" "by a single process."

3rd. "A method of obtaining photogenic images upon copper."

4th. "A smooth surface" of "suitable metal, is coated with an "extremely thin layer of silver; the silver is then made sensitive "to light," "and a photogenic image is received upon it; the "plate, with the image, is then placed in a horizontal position, "and a solution of acetate of lead in water is poured upon it; a

"galvanic current is then made to pass through the plate and the "solution, which causes a colored film to precipitate upon the "plate."

5th. "A method of obtaining very thin silver plates" for the purposes of photography.—A thin layer of copper is deposited "by the galvanic process now well known by the name of electro-"type," upon a polished metal plate, a sheet of card is glued to the back of the said layer, and (when the glue is dry) the card and layer are removed from the polished surface, "this copper is "then silvered" by dipping into a solution of silver.

6th. "Transferring photogenic images from paper to metal."

A Disclaimer was enrolled on March 8th, 1854, by the inventor, in which the 3rd, 4th, 5th, and 6th portions of the invention are disclaimed.

[Printed, 6*d*. No Drawings. See Repertory of Arts, vol. 16 (*new series*), p. 165; London Journal (*Newton's*), vol. 19 (*conjoined series*), p. 182, and vol. 44 (*conjoined series*), p. 457; Mechanics' Magazine, vol. 35, p. 186; Inventors' Advocate, vol. 5, p. 99; and Engineers' and Architects' Journal, vol. 4, p. 429.]

A.D. 1843, May 4.—N° 9720.

MOREWOOD, EDMUND, and ROGERS, GEORGE.—"Improved "processes for coating metals."

A first coating of tin is given to clean "iron or other metal" by means of a solution of chloride of tin. In tinning iron plates they are placed in the tank *in layers that alternate with layers of granulated zinc*, and the undermost iron plate rests on pieces of zinc at the bottom of the tank, the iron in all cases having many points of contact with the zinc; the same principle is adhered to in tinning other articles with a first coating. The strength and temperature of the solution determine the speed with which the operation may be conducted. The plates may then be coated with zinc, tin, or lead by immersion in a bath of molten metal.

"In coating surfaces of metal with other metal in a molten "state, we prefer doing it, if the surfaces be iron, by introducing "them previously coated, as above explained; or the surfaces of "metal may be only cleansed, and the coating is performed by "passing plates or other suitable pieces of metal between the "rollers of a machine working in contact with molten metal kept "melted in a suitable vessel." Instead of the said rollers, a bar "may be used for causing the plates as they are introduced below "the metal to be insured descending to the same extent below "the molten metal."

The flux preferred (in the molten metal process) consists of fatty matter in combination with the chlorides of zinc and ammonium.

[The effect of the layers of granulated zinc, in the above process, is to actuate a galvanic circuit, in which the iron is the negative metal, and thence to promote the perfection of the coating.]

[Printed, 1*s*. Drawings. See Repertory of Arts, vol. 2 (*enlarged series*), p. 353; London Journal (*Newton's*), vol. 25 (*conjoined series*), p. 37; and Mechanics' Magazine, vol. 39, p. 369.]

A.D. 1843, November 21.—N° 9957.

CLAUDET, Antoine François Jean (*a communication*).— " Improvements in the process and means of obtaining the repre- " sentation of objects of nature and art."

The process treated of in this Specification relates to " rendering " the daguerreotype picture susceptible of producing by printing " a great number of proofs or copies, thereby transforming it into " a complete engraved plate."

The "preparatory engraving" of the plate is accomplished by means of an acid solution containing water, nitric acid, "nitrate" [nitrite?] "of potassa," and common salt. This process is accompanied by treatment with certain chemical solutions before the acid solution is employed, and after it has acted upon the plate. By repeating the whole process a second engraving or " biting" is produced, and a third biting is obtained by nearly a similar routine.

The "last operation of biting in" is accomplished by inking the plate with a siccative ink, drying the ink and polishing the plate with cotton and "ponce" [pounce?]; the white parts are then protected by means of an "electro-chemical coating of gold." The plate is covered with a thin coating of mercury before gilding; the gilding solution preferred contains ferro-cyanide of potassium and chloride of gold. The lampblack (if any) is then removed, and the plate " bitten in by aquafortis."

Before submitting the plate to the operation of printing " it is " necessary to protect it by a slight coating of copper, which is " obtained by the electrotype process." As the coating wears it is removed, and a fresh one applied in its place. This removal and fresh application of the copper covering "may be repeated as " many times as may be required."

[Printed, 4*d*. No Drawings. See London Journal (*Newton's*), vol. 25 (*conjoined series*), p. 111.]

A.D. 1844, February 21.—N° 10,063.

PARKES, ALEXANDER.—"Improvements in the manufacture "of certain alloys or combinations of metals, and in depositing "certain metals."

[The title of this invention is the same as that of No. 10,366.]

[No Specification enrolled.]

A.D. 1844, May 22.—N° 10,196.

MEEŪS, JOSEPH (*a communication*).—"Certain improvements in "weaving and in weaving machines."

1st. "Several methods of vertical weaving."

2nd. A "method of circular or cylindrical weaving with a "continuous motion of the healds & of the shuttles."

3rd. "Certain new methods of giving motion to the shuttle." One of the methods proposed is "to employ for this purpose *the* "*power of a magnet* acting upon an iron shuttle."

4th. "The employment of stiff or solid healds formed with "vertical blades, to serve as a substitute for the comb." In this improvement "a novel construction and arrangement of the "shuttle" may be adopted.

5th. "The application of the foregoing improvements to the "jacquard machine."

6th. "Immersing the warp beams in a liquid containing either "coloring, or pulpy, or fibrous, or glutinous materials, according "to the nature of the intended fabric, so as to cause the fabric to "be died or prepared for dying or to be sized, or to be rendered "impermeable either to air or to water in the process of "weaving."

7th. "Certain means of forming artificial selvages to fabrics "produced by some of the aforesaid means."

[Printed, 1*s*. Drawings.]

A.D. 1844, July 31.—N° 10,282.

FONTAINEMOREAU, PIERRE ARMAND LE COMTE DE (*a communication*).—"Certain improvements for coating or covering "metals and alloys of metals."

The articles to be coated are first cleansed by means of "a solu- "tion of carbonated residuum of cyanuret of potassium," if of

iron; they are then slightly tinned or zinced, electro-coated with red copper "by means of an alkaline and an acid bath," and finally immersed in a bath containing zinc as well as copper, in order to electro-deposit upon them a coating of "yellow copper."

One of two alkaline baths may be used. One of the alkaline baths contains cyanuret of potassium, sulphate of copper, and prussiate of potash; the other alkaline bath contains prussiate of potash, sulphate of copper, and "the carbonated residuum of "cyanuret of potassium."

The acid bath contains sulphate of copper and sulphuric acid, with a small quantity of chloride of sodium.

The yellow copper bath contains cyanuret of potassium, sulphate of zinc, and "the double salt of copper before described."

In the first place either of the alkaline baths are used, then to increase the thickness of the coating, the articles are electro-coated in the acid bath; the yellow copper bath is then employed to finish the operation.

In working the acid bath Smee's battery is preferred, and the battery surface should "correspond" to the surface of the article to be coated.

[Printed, 4d. No Drawings.]

A.D. 1845, March 3.—N° 10,539.

TALBOT, WILLIAM HENRY FOX.—"Improvements in obtaining "motive power, and in the application of motive power to rail- "ways."

1st. Motive power is obtained by communicating heat to solid carbonic acid, so as to render the same gaseous at suitable intervals. The requisite heat is applied by means of wires connected to a galvanic battery. Reference is made to No. 8650 (Old Law).

2nd. Two reservoirs of liquid carbonic acid are placed one above the other and communicate by a tube; one reservoir is cold, the other warm. The warm gas raises the piston of an engine, and is then condensed by the cold liquid when the piston descends; this action is then repeated.

3rd. An expansible liquid is placed in a cool upper reservoir, from which a vertical tube descends, the lower part of which is kept hot, and is closed by a piston. Regulated portions of the liquid are let fall into the hot end of the tube and work the piston, the tube being closed behind the liquid.

4th. By placing a number of electro-magnets one above the other, the motion of the end magnet is made considerable.

5th. The action of iron cylinders upon a transverse bar connected to certain helices is made to produce motive power.

6th. Two wheels are made to urge each other forward alternately by means of magnetised cogs, the cogs being magnetised alternately.

7th. "A machine upon the principle of the horizontal windmill."

8th. "An improvement in the application of atmospheric "motive power to railways."

[Printed, 8d. Drawing. See Repertory of Arts, vol. 7 (*enlarged series*), p. 20; and Engineers' and Architects' Journal, vol. 8, p. 331.]

A.D. 1846, January 29.—N° 11,065.

HOWELL, George.—This invention is "For coating with a "metal the surface of articles formed of copper or copper alloys, "or iron wrought or cast."

This invention relates to coating the above-mentioned surfaces with platinum by means of a galvanic battery in connection with an aqueous solution of certain salts of platinum. The solution is worked by means of a platinum anode, and "the duration of "the process" depends "on the thickness of the layer of the "platinum intended to be deposited."

The depositing trough contains bichloride of platinum and potassium dissolved in a solution of oxalic acid; the addition of caustic potash renders this solution fit for use.

The coating of platinum obtained on the cleansed surface of the article is white and reguline.

In making the depositing solution, "instead of oxalic acid other "substances, as tartaric, citric, and acetic acids, acid oxalate of "of potash, and acid tartrate of potash, may be employed to "make the solution of the salt of platinum."

"Instead of making the salt of platinum by the addition of "caustic potash to the dried salt of platinum, soda may be substituted for potash in equivalent quantity, or the ready-made "double salt of chlorides of potassium and platinum can be "taken. This double salt dissolves readily in all the above-"mentioned substances, but the preparation of this salt from the "solution of chloride of platinum is not so convenient or cheap "as the method first above mentioned."

[Printed, 4d. No Drawings. See Patent Journal, vol. 1, p. 179.]

A.D. 1850, November 23.—N° 13,363.

SHEPHERD, George, and BUTTON, Charles.—" Certain " improvements in the means or appliances used in conveying " telegraphic intelligence between different places."

1st. The manufacture of the " electro-marine line."—The gutta-percha-covered line wire is wrapped with certain saturated media and cased with metal.

2nd. Laying the electro-marine line in grooves in the links of peculiarly-constructed chains, thus protecting and forming a flexible bed for the same.

3rd. The use of certain clasps for securing the electro-marine line to the chain and an "arch-footed link stud for the said clasps " to pass through;" also other modes of attaching the electro-marine line to the chain.

4th. Attaching the electro-marine line to a wire rope or flexible band, being either clasped thereto in parallel lines, or helically wound round the same.

5th. Attaching testing boxes to the chains at intervals of one or two miles.—The testing box has a centre piece and two or more cap pieces, which fix the electro-marine lines in position; provision is thereby made for repairing the lines.

6th. Attaching surface buoys to the testing boxes and to the chains, to indicate the line of telegraph and to effect repairs.

7th. The use of immersed buoys " to suspend the chains or " flexible bands attached to the electro-marine line when placed " in very deep water, horizontally, at intermediate distances " between the testing apparatus, and vertically at intermediate " distances between the testing apparatus and the surface " buoy."

8th. A metallic casing to protect the electro-marine line when it arrives on the sea shore, jointed together with vertical and horizontal flanges.

9th. A metallic casing with male and female hollow spheres united with horizontal flanges, to protect the said line and bed on arriving at the sea shore.

10th. A mode of fastening the outer casing to the shore or rocks.—This is accomplished by means of holding down bolts that are either fastened into piles or into holes bored in the rock.

[Printed, 2s. Drawings. See Mechanics' Magazine, vol. 54, p. 438.]

A.D. 1851, January 31.—N° 13,484. (* *)

GAGE, JEAN PAUL.—"Improved chemical compounds for tissue, "bandages, wafers, and also for surgical purposes." These are composed of vegetable substances, as "resins, resinous gums, such "as india-rubber, gutta percha, and other similar substances," and of "metals having the virtue of producing electricity," "pre-"ferably copper and zinc." Three tissues are made, the 1st composed of metals in a powder, "mixed with the above vegetable "substances, and rolled into sheets." This "preparation is appli-"cable to surgical medical bandages;" this combination is also applied to "a tissue of silk, cotton, or flax," and is "used to "prepare the vegeto-metallic or electro-magnetic tissues." The 2nd and 3rd tissues are made by laying "metals in lamellated "particles," and "metals in blades, or thin sheets of variable "length, breadth, and thickness," on the prepared tissue of silk, &c. The two metals in pairs are arranged in different ways, and pressure is applied. To set in action the electricity, dilute acid or vinegar may be employed, but no acid for the first tissue. Wafers are made by adding more metal raspings to the first combination, rolling it into sheets, and cutting it into discs; these are made to adhere after by heat.

[Printed, 4d. No Drawings. See Mechanics' Magazine, vol. 55, p. 154; and Patent Journal, vol. 11, p. 228.]

A.D. 1851, May 3.—N° 13,620. (* *)

COOKE, WILLIAM (*a communication*).—"Improvements in the "manufacture of soda and the carbonate thereof. These are, obtaining "caustic soda and carbonate of soda (soda ash)" as follows:—A large tank is divided into three compartments by means of two porous diaphragms; two copper plates are in the middle compartment, and large pieces of iron, all connected together by a clean surface, are in each of the two other compartments, each copper plate is connected by a slip of copper "with "the next mass of iron;" a solution of common salt is put into each compartment with the iron, and clean water in the compartment with the copper. The vessel is covered up and "the "temperature being now kept above 70° F., the decomposition "of the salt will be accomplished within seven days." "A "solution of caustic soda" will be found in the middle compartment. If the solution is intended for the manufacture of

soda ash, it must first be boiled dry. "The caustic soda when "dry must be kept hot and stirred for an hour or two, during "which time it will absorb the carbonic acid from the atmosphere "with great avidity; it will greatly increase in bulk, and will be "finally converted into pure carbonate."

[Printed, 4d. No Drawings. See Mechanics' Magazine, vol. 55, p. 396; and Patent Journal, vol. 12, p. 61.]

A.D. 1851, June 12.—N° 13,664.

TALBOT, William Henry Fox.—"Improvements in pho-"tography."

1st. The amphitype process.—"A new method of producing "photographic images upon glass." In this process albuminized glass plates are used in connection with nitrate of silver and proto-iodide of iron, the sensitizing solution contains nitrate of silver and acetic acid, the developing solution is sulphate of iron, and the fixing agent hyposulphite of soda.

Apparatus suitable for use on a journey are set forth in the Specification in detail. In one apparatus tubes and stop-cocks are used to supply the various fluids in succession to the plate, the plate being in the camera from the sensitizing operation to the termination of the process. The tubes and stop-cocks, if of brass or copper, *should be previously silvered or electro-plated.*"

2nd. Using "an electric battery" to obtain "the photographic "pictures of objects which are in rapid motion."—A powerful electric battery, arranged in a darkened apartment, is discharged so as to illumine the object with a sudden flash of light, and thus impress its image upon a photographic glass plate. By this means the rapidity of the motion does not affect the accuracy of delineation.

A Disclaimer was enrolled on March 8th, 1854, by William Henry Fox Talbot. The apparatus for use on a journey is herein disclaimed, also the whole of the 2nd part of the invention.

[Printed, 6d. No Drawings. See Repertory of Arts, vol. 19 (*enlarged series*), p. 41; and Mechanics' Magazine, vol. 55, p. 497.]

A.D. 1851, August 23.—N° 13,726.

PALMER, James.—"Improvements in delineating objects, and "in apparatus and materials for that purpose."

Among the materials employed for the above-mentioned purpose, "insoluble gelatine" is described. The preparation of this substance forms a portion of the present invention. Amongst

other uses the employment of the said insoluble gelatine "in "moulds for electro-metallurgy" is set forth.

To manufacture insoluble gelatine in sheets, a solution is made in water of alum, acetate of lead, and borax; or these salts may "be first dissolved in separate portions of water and then mixed. "In either case a white precipitate is formed, which is allowed to "subside, and the clear liquor is drawn off, and, if necessary, "filtered to remove any of the precipitate contained in it." Sheets of gelatine, or sheets of glass coated with gelatine, are immersed into this clear solution and left for twelve hours therein. "The sheets are then taken out and allowed to dry, and are then "fit for use." Other solutions may be employed to render the gelatine insoluble, but that described above is preferred.

"Engravings made on the insoluble gelatine may be copied by "means of the electrotype, so as to obtain the engraving in copper. "For this purpose the gelatine plate is covered with plumbago or "other conducting substance, and placed in the electrotype appa-"ratus in the ordinary manner. The insolubility of the gelatine "protects it from being dissolved or injured by the metallic solu-"tion in the electrotype apparatus; a reverse of the plate is thus "obtained from which electrotyye plates can be made in the "usual manner."

[Printed, 1s. 4d. Drawings. See Mechanics' Magazine, vol. 56, p. 197.]

A.D. 1852, November 1.—N° 590. (* *)

PETRIE, WILLIAM.—"Improvements in the manufacture of "sulphuric acid." Firstly, a furnace for burning sulphur with an open back end covered by a grating and arranged so that drops of melted sulphur shall trickle down between it, "and so that the "loose bits or dust of sulphur will not fall through." Behind this grating is placed a heap of sulphur, and by means of a diaphragm and damper "the sulphur against the grating will be "melted at a very slow rate," and also "the hot gases are made "to sweep against the grating." The pan "where the sulphur "chiefly burns is placed slightly inclined downwards from back "to front." Air enters under the doorway. "Beneath the pan "or plate on which the sulphur is burnt" are "very shallow flues "or channels."

Secondly, a furnace for burning substances not associated with a large quantity of sulphur, "the raw material and the air being "made to move through it in opposite directions." The furnace

is fed at its upper part, air is made to enter "at an intermediate "point between the upper and lower part of the material."

Thirdly, the condensation of sulphuric acid fumes by "draught-"cells" in which are fragments of materials, and with or without water; using hot furnace gases into it for the purpose of concentrating the acid; also nitric acid in the aqueous liquid. Platina is used on an extended surface; this is called a stereo-oxidator.

In the Provisional Specification the "draught-cell" is said to be "insulated and charged with electricity of tension," but in the Final Specification no mention is made of the use of electricity.

[Printed, 1s. Drawings.]

A.D. 1853, March 28.—N° 741.

DERING, George Edward.—"Improvements in the manu-"facture of certain salts and oxides of metals."

The said salts and oxides are manufactured "from the solutions "and matters resulting from the working of galvanic batteries."

The salt may be made to crystallize from a partially saturated liquid; the solutions of percolating batteries may be so treated. According to another plan, the solution may be saturated before crystallization, either by the addition of the metal of the salt thereto, or by the addition of other metals or materials. Another method of obtaining saturated solutions consists in drawing off at intervals a portion of the solution from the lower part of the battery cell, "and replacing it by fresh supplies of the exciting liquid."

To carry out this invention in double-fluid batteries, the negative elements of a Grove's or Maynooth battery are excited by a mixture of nitrate of soda and sulphuric acid; the positive elements may be excited either by a weak acid solution, by a saline solution, or by pure water. Porous divisions are employed in batteries having only one exciting liquid.

To produce (from refuse solutions) carbonate of zinc, either potassic or sodic carbonate in solution is added to the zinc solution; if this carbonate be heated to redness, the oxide of zinc is formed. Zinc sulphide is derived by heating the sulphate in a closed crucible with charcoal; or by treating the refuse results with sulphuretted hydrogen. Salts of lead are similarly obtained. Salts of tin and of iron may also be derived from refuse solutions. Hydrated oxides may be precipitated from refuse solutions by means of ammonia or the fixed caustic alkalies.

[Printed, 6d. No Drawings.]

A.D. 1853, August 5.—N° 1836.

NEWTON, WILLIAM (*a communication*).—" Improvements in " the process of coating cast iron with other metals and the " alloys of other metals."

1st. Coating cast iron with copper " by galvanic action."—The depositing solution used consists of carbonate of copper dissolved in a solution of cyanide of potassium. The deposit may be made directly upon the surface of the cast iron, or on zinc previously deposited thereon.

2nd. Coating cast iron with brass " by galvanic action."—The electro-depositing solution is formed " by mixing with the solution " of copper employed in the first part of the invention a solution " of zinc prepared in substantially the same manner." The precise method employed to make the zinc solution is to precipitate cyanide of zinc by means of " prussiate of potash," and to dissolve the precipitate in a solution of cyanide of potassium.

The articles are first pickled in dilute sulphuric acid, " scratch- " brushed," and then pickled in dilute nitro-muriatic acid. The articles, thus cleansed, are electro-coated with zinc, then with copper, and, if necessary, with brass, by means of the above-described solutions; the coating of copper can be deposited directly on the surface of the cast iron, or the brass coating directly on the zinc surface, but the inventor prefers using the sequence of operations detailed above.

The cast iron being thus coated with copper or brass, the surface may be bronzed or coated " with silver or gold in any of the " well known modes of coating brass or copper with those fine " metals."

[Printed, 4*d*. No Drawings.]

A.D. 1854, October 30.—N° 2308.

NEWALL, ROBERT STIRLING (*a communication*).—" Improvements in electric telegraphs."

" The arranging or combining electric telegraph apparatus in " such manner as to be enabled to telegraph simultaneously in " opposite directions between two stations, using one line wire " and the earth as the means of communication."

The application of this invention to Morse's apparatus.—Besides the Morse instrument, relay, local battery, line-wire battery,

and key at each station, there are two galvanometers (one ordinary galvanometer, and one differential galvanometer), and a resistance coil. In one instance the line-wire batteries are connected so as to assist each other when the key is depressed, and in another instance they neutralize one another during the depression of a key. The circuit from the key at the transmitting station divides, half being transmitted to the distant station and half circulating round the two galvanometers, the resistance coil and the relay at the transmitting station. The resistance coil serves to make the resistance in each of these circuits equal. In simultaneous communications, in the first battery arrangement the increased power of the batteries produces the signal at the distant station through the line-wire circuit; in the second battery arrangement the neutralized power of the batteries in the line-wire circuit enables the other half of the circuit to exhibit its signal.

The application of this invention to the needle telegraph.—The existing needle instruments are used exclusively as sending instruments, and the receiving needle instrument contains double coils. The action of the instruments on a simultaneous depression of the keys is similar to that described in the Morse apparatus. "The "earth connects the zinc poles of both batteries."

[Printed, 6d. Drawing.]

A.D. 1854, November 8.—N° 2366.

SIEMENS, Charles William (*a communication*).—"Improve-"ments in electric telegraphs."

1st. Arrangements for transmitting signals simultaneously in both directions by means of a single line wire.

In the first arrangement, at each station there is a galvanic battery, contact or key lever, "pecker," resistance coil, and a "Morse instrument." The depression of one key only sends a current from the battery through two circuits, one of which is the line-wire circuit, the other is the coil circuit, and it neutralizes the effect of the current upon the home signal instrument; the line-wire current, however, produces an effect on the distant "pecker" and recording instrument. The simultaneous depression of both keys causes the neutralization of the current in the line-wire circuit (the batteries having their similar poles opposed to each other), but the coil circuit in each shows the signal of the distant station.

In the second arrangement, the force of both galvanic batteries (when both keys are depressed) is sent through the line-wire circuit, and "peckers" with weak and strong springs respectively are placed at each station. The weak springs act on the depression of one key only, and the strong springs when both keys are simultaneously depressed.

2nd. "Transmitting instruments or peckers."—The iron cores of the 'peckers" mentioned above in the first arrangement are moveable within their fixed coils, and have special screw adjustments for the armatures and contacts

3rd. Perforating telegraphic strips of paper applicable to Bain's or Morse's instruments.—Instead of dots and lines, the symbols consist of dots only, two dots close together being equivalent to a line in the Morse system. Three punches are used, one for the single dots, one for the double dots (lines), and one for the spaces. Upon the release of the dot or line key, a catch forces the paper forwards.

[Printed, 1s. Drawing.]

A.D. 1855, October 4.—N° 2215.

CORNFORTH, Henry.—"A new or improved manufacture of "hooks and eyes."

The hooks and eyes are made of iron or steel wire, and are afterwards coated with copper or brass, and then with silver.

The coating with copper is effected by means of a boiling solution of cyanide of copper, "the said solution being used in "conjunction with an electrical current, according to the well-"known art of depositing metals by electricity."

The coating of silver is applied by immersing "the said hooks "and eyes coated with copper in a solution of cyanide of silver, "either with or without the application of an electrical current."

"The hooks and eyes should be cleaned by immersion in dilute "sulphuric or hydrochloric acid, or otherwise, before being "coated with copper; and when an electrical current is employed, "I prefer to place the hooks and eyes in a revolving metal cage "or case, or in a metallic sieve, or I thread them on a wire, "which said cage or case, sieve, or wire must be immersed in "the solution. The use of the said cage or case, seive, or wire "is to establish that metallic communication between the hooks "and eyes and the wire conveying the electrical current which is

' necessary in the electrical deposition of metals. In all other ' respects the process of coating the hooks and eyes is conducted ' according to the ordinary methods of coating metals by elec- " tricity."

[Printed, 4d. No Drawings.]

A.D. 1855, December 13.—N° 2816.

POITEVIN, Alphonse Louis. — " Improved photographic " engraving."

A chromatized film of gelatine is produced upon a sheet of glass, exposed to the action of light so as to produce a picture, and plunged into water; the water expands the parts of the film which have not been acted upon by light, and the result is a picture in which the reliefs correspond to the darks, and the hollows to the lights. No nitrate of silver is used to sensitize the plate.

A cast of the above-mentioned picture may be taken either in plaster of Paris or by means of the electrotype process. In taking a plaster cast a solution of protosulphate of iron is first applied to the gelatine in order to give consistence and strength to the plaster.

The metallizing process used in electrotyping a photograph consists of impregnating the gelatine film with a solution of iodide of potassium, then immersing it in a nitrate of silver solution and reducing the metallic silver upon the gelatinous surface by means of a solution of protosulphate of iron.

Metallic plates for printing from may be obtained from the plaster or from the electrotype moulds by the electrotype process, " or the plates or casts may by " [be?] " multiplied and reversed " by the ordinary processes."

" The engraved plates or surfaces thus produced are adapted " for printing upon paper, cloths, and other fabrics or materials, " and also for embossing or stamping card, or paper, or other " suitable material, and also as moulds for earthenware, porcelain, " or other plastic substances, and for other purposes for which " engraved plates or surfaces are required."

[Printed, 4d. No Drawings.]

A.D. 1856, April 15.—N° 899.

SOUTHBY, Edmund Richard.—" An improvement in coating " iron with copper."

" Articles of wrought iron, cast iron, or steel," are treated

"with a hot alkaline solution previous to depositing copper "thereon."

The article is cleaned with an acid pickle, dipped into a weak alkaline solution, dried, and scoured with dry sand.

The article thus prepared is suspended for some time in a strong boiling solution of carbonate of soda; it is then immediately placed "in the coating bath, which I prefer to prepare by dissolv- "ing ten ounces" [ounces?] "of cyanide of potassium in one "gallon of water, and adding thereto as much freshly precipitated "oxide of copper as it will take up. This bath I work at a "temperature of 180° Fahrenheit, *with a copper pole*, and with "the precautions which are usual when depositing copper.

"I would remark, that in the place of preparing the article for "receiving the coating of copper by means of a separate alkaline "solution, the solution which is used in the coating bath being "alkaline, may be used for this purpose, the article being kept "heated for some time in this bath before the deposition is com- "menced, and this process has advantages in coating large masses "of iron.

"When articles of wrought iron, cast iron, or steel are coated "with copper by the process which I have described, the copper "will adhere firmly to such articles and will not scale off when "the article is heated to a red heat."

[Printed, 4*d*. No Drawings.]

A.D. 1856, June 10.—N° 1373.

SKAIFE, THOMAS.—"Spring-folding camera shutters, for the "more speedy and convenient mode of taking photographic "pictures than has been hitherto adopted."

The improvements comprised in this invention consist of:—

1st. "Substituting for the ordinary dark slide or shutter, made "use of in the camera for covering the sensatized plate, a pair of "folding shutters," which "are so arranged as to open and shut "inside the camera."

2nd. "Adapting a second pair of shutters similar to the former, "to be opned and closed by a like arrangement an movement, "and fixed or attached to that part of the camera a little in front "of the inner face of the lens, so that when shut or closed they "will exclude the light by covering the lens. The object of this "second pair of shutters is to keep the lens covered until the "first pair is at least three quarters opened, when the second

" pair is fully opened during the conclusion of the movement " which opens the first."

In the Final Specification it is stated that, "In order still " further to accelerate the speed by which the light may be " admitted and shut off from the sensatized plate in the camera, " when an almost instantaneous action is required in obtaining a " picture of an object or of some rapidly moving body," a thin plate "having a circular aperture in its centre nearly equal to one " diameter of the lens" is used. This plate is placed between two glass guides and is acted upon by an India-rubber tube attached to a draw-thread. When the picture is to be taken a trigger is pressed and the plate darts along the grooves. "The speed may be still " further increased *by placing a magnet* at the terminous of the " glass guides, so as to act upon and attract the steel plate shutter " towards it."

[Printed 8*d*. Drawing.]

A.D. 1856, December 3.—N° 2871.

CHEETHAM, JAMES KINDER.—" Improvements in the ap- " plication of photographic pictures to metal and other surfaces, " and in rendering the same applicable as printing surfaces."

1st. "Obtaining designs upon copper and other metallic " surfaces, so as to constitute pictures, which may so remain for " ornamental or other purposes, or upon which the engraver may " work by any of the usual methods."—The reduced silver from a collodion film is transferred " to the copper or other such sur- " face, in such manner that it shall be free from the film which " supported it, and in direct contact with the metal;" this transference is accomplished by the use of metallic mercury; the copper plate is amalgamated. " I have particularly alluded to " copper as the substance upon which the design is to be pro- " duced, but zinc, silver, steel, or other materials may be employed, " and these may be first coated with copper *by electro-metallurgy*, " then treated as above, and those parts of the copper not covered " by the picture subsequently removed by acids, or by other " means."

2nd. " A method of obtaining surfaces for printing from " photographs."

3rd. " Obtaining printing surfaces upon the lithographic prin- " ciple."—The stone is rendered " a conductor of electricity by a " coating of phosphorus or other suitable substance," and a

film of copper is deposited thereon. The design is transferred, as above set forth, to the copper film, and the "bare copper" is dissolved away; "the stone which was beneath this is then run "over with the inking roller, and the metal picture subsequently "removed, leaving a clear surface of stone for the light portions; "or this operation may be reversed."

[Printed, 4*d*. No Drawings.]

A.D. 1857, January 27.—N° 240.

BOUSFIELD, George Tomlinson (*a communication*).—"Improvements in coating iron or other metals with tin."

The cleansed metal is immersed in a heated solution of tin "*together with scraps of zinc*, about two pounds weight or more, "and immediately pure tin will be precipitated upon the surface, "forming a perfect coating so intimate as to protect the metal "from the action of humidity or of salt water, or the same effect "will be produced if the whole vessel were of zinc instead of "introducing scraps of that metal. The thickness of coating "will be determined by the length of time the articles are in the "bath, but in eight hours the quantity deposited will be sufficient "for most practical purposes."

The solution used contains cream of tartar, "common whiting "as an alkali," and "the common tin salt of commerce."

In addition to the above points, the Provisional Specification sets forth as follows:—"Steam is then applied to the solution of "tin, and the effect is, that the tin is precipitated upon the iron "to any thickness desired. Steam is chief agent in exciting the "action which precipitates the tin from the solution. When "coated, the metal will resist acids generally and heat, so that "when red hot the tin will not burn off."

[The deposition of the tin in intimate contact with the iron and of a thickness dependent upon the time of the operation, is clearly owing to the contact of the article to be coated with scraps of zinc and not to the action of steam, for the zinc establishes a galvanic circuit during deposition.]

[Printed, 4*d*. No Drawings.]

A.D. 1857, June 24.—N° 1766.

PARKES, Alexander.—(*Provisional Protection only.*) "Improvements in coating metals with other metals."

"This invention has for its object improvements in coating "metals with other metals. For this purpose zinc in a granu- "lated or divided state, or other metal positive to the metal to "be coated, is added to the coating solution, which may be "prepared as if it were to be used for depositing metals with a "galvanic battery in the ordinary way of electro-deposition. "The article to be coated is immersed and moved about rapidly "in the solution *in contact with the zinc or other metal* until a "coating of sufficient thickness is obtained. This process is "particularly applicable to coating small articles, such as pins, "nails, or screws, which cannot conveniently be coated by the "use of a battery."

[The contact of the zinc with the article to be coated, both being in the solution (as above set forth), makes it necessary to regard this invention as an application of electric force to the deposition of one metal upon another metal.]

[Printed, 4*d*. No Drawings.]

A.D. 1860, April 9.—N° 893.

EIDLITZ, Leopold.—(*Provisional Protection only.*) "Improve- "ments in producing printing and other irregular surfaces by the "aid of photography."

"The subject of my invention is an improved method of "preparing by the aid of photography the moulds upon which "a metallic deposit is to be made by the electro-metallurgical "process."

A film of gelatine (sensitized by means of bichromate of potash and mounted on a glass plate) is impressed with the photographic image and placed in cold water. The water expands the gelatine at those portions of the picture that were in shade, the light having rendered the gelatine incapable of expansion wherever it has shone on the picture. After having been left in an aqueous solution of sulphate of copper for some time the plate is washed and dried on the surface. "The mould being thus prepared is "now coated with a metallic substance, in order that it may "receive the deposit of metal when in the precipitating trough; "and this I effect by pouring upon it a solution of chloride of "gold, allowing this to remain for about one minute, then permit "the surface to dry again until all visible moisture is removed

" from it. The plate is now exposed to the fumes of phosphorus
" dissolved in sulphuric ether, and when again dried it will be
" seen to be covered with metallic gold. It is now ready for the
" deposit of the copper or other metal upon it. When removed
" from the trough, the glass will readily separate from the gelatine,
" and that may be washed off."

For a letter-press printing surface a positive photograph is employed in the photographic printing frame, or the metal may be electro-deposited upon a metallized wax cast of the gelatine plate. An engraving or other design may be used in the printing frame "instead of the photographic negative or "positive."

[Printed, 4*d*. No Drawings.]

A.D. 1860, December 10.—N° 3032. (* *)

JOHNSON, John Henry (*a communication from François Guichene*). — (*Provisional Protection only.*) "Improvements in "apparatus for striking the hours on bells."

"This invention relates to a peculiar arrangement and com-
"bination of mechanism, whereby any ordinary clock or time-
"piece is made to bring into action at the desired time suitable
"striking mechanism for sounding the hours, half-hours, and
"quarters, on a set of bells entirely disconnected from the clock
"or time-piece which governs them. In carrying out this inven-
"tion it is proposed to adapt to any ordinary clock or time-piece
"suitable mechanism for establishing an electric circuit at the
"desired intervals of time through an electro-magnet, which
"magnet by attracting an armature, releases a train of wheel-
"work or auxiliary mechanism set in motion by a weight or
"spring. This auxiliary mechanism is connected with the or-
"dinary striking movement of a clock and serves to release the
"same by lifting a detent, whereupon the main striking mecha-
"nism, which is actuated by a weight or spring, instantly
"comes into action and works the striking hammers of the bell
"or bells. Thus, in place of the 'going mechanism' of the clock
"or timepiece being required to start the striking movement
"directly, it has merely to establish an electric contact between
"two surfaces, when the resulting current sets in motion the
"more powerful mechanism which starts the striking movement.
"It is thus obvious that the largest public clock bells may be

" struck by mechanism brought into play originally by a small
" clock or timepiece."

[Printed, 4d. No Drawings.]

A.D. 1861, March 5.—N° 561.

ALCAN, Emile (*a communication from Michel Alcan*).—" A
" method of simultaneously marking and piercing or perforating
" plates of metal, cardboard, paper, and other material employed
" in looms for weaving figured fabrics."

" A pattern formed upon a metallic paper divided into squares,
" in which an insulating varnish is used instead of colours is
" substituted for the ordinary reading (l'opération du lisage).
" The mode of operation for one single line or one single weft to
" be prepared is as follows :—Let us suppose the pattern prepared
" with interlineations on metallic paper and in insulating varnish,"
the said pattern being " in communication with the poles of a
" battery through a flat or cylindrical metal surface, the current
" will be broken at all the parts covered with the insulating
" varnish ; it may also be transmitted to rods, teeth, or metallic
" points corresponding to the conducting points, that is to say,
" to such parts of the pattern as are not protected by the varnish."
If " a metallic point rests upon every interlineation of the pattern,"
and it is " united by levers" to a perforator " under which a band
" of cardboard" has been placed, the completion of the electric
circuit " will cause the points, rods, or teeth resting upon the
" metallic parts to adhere, while the non-conducting points will
" remain free as well as their corresponding piercers," " it will
" then be only necessary to make them act simultaneously by any
" suitable mechanical arrangement, in order that each shall pierce
" the required hole. The pattern is placed so that each of its
" lines is successively presented in the order of the wefts (that is
" to say, so that each transverse interlineation shall act in turn
" upon the teeth of this species of comb) in front of the selection
" of piercers which are to act."

[Printed, 10d. Drawing.]

A.D. 1861, March 13.—N° 619.

CIMEG, John.—" Improvements in silvering glass and other
" surfaces."

" For this purpose I employ a mixture of ammonia, nitrate of
" silver, with a solution of Rochelle salt (tartrate of potash and

" soda); this mixture is applied to the surface of glass to be " silvered, and after a short time the silver is deposited on the " glass as a bright film. The silver is deposited at the ordinary " temperature of the air, thus it is not necessary to heat the " surface as when other mixtures are employed. The film of " silver may be strengthened " *by electro-depositing* " over it a " cheaper metal, such as copper. The process above described " is also applicable for silvering other surfaces; it is, for example, " very useful for giving a metallic and conducting surface to " articles on to which it is desired *to deposit copper by electricity*, " and where the article itself is not a conductor of electricity.

" In order to silver the surface of paper, or of a woven fabric, " or other similar surface, I first deposit the silver on to a polished " surface, such as glass, then attach the fabric thereto by suitable " cement, and carefully strip the fabric together with the silver " from the polished surface. In some cases I obtain an orna- " mental effect by depositing the silver on a surface on which " a pattern has been produced by dulling a portion of the " surface."

" When it is desired to give a metallic and conducting surface " to an article which it is desired to electrotype, say, for example, " a medallion of wax or gutta percha, I silver it as already de- " scribed, sufficient of the silvering mixture being employed to " cover every part of the surface."

[Printed, 4*d*. No Drawings.]

A.D. 1861, August 3.—N° 1936.

LEWIS, JOSEPH.—" Improvements in producing and treating " printing surfaces, in producing and preparing transferring sur- " faces, in transferring, in producing impressions on an altered " scale, in preparing or treating surfaces of lithographic stones, " and in obtaining devices or designs; also in agents and appa- " ratus used in some of such improvements, parts of the invention " being also applicable to photography, and to ornamenting pottery, " porcelain, and glass."

This invention is set forth in 26 heads; the following treat of processes in which electric force is employed:—

4th head.—" To produce upon metal, raised or sunken designs " for transferring or printing."—A transfer is produced upon an engraver's plate, the ink portions being dusted with resin powder.

The inventor prefers "iron, brass, zinc, or steel as the metal;" if copper be used, it is covered with a thin coating of zinc; if iron or steel, the surface is gilt "after the impression is produced "when positive impressions are used," or the surface is coated with mercury. The design is produced in a greasy substance (which is afterwards removed), and the plate is submitted to galvanic action in a solution of gold or other metal that will withstand the etching process. "In the case of negative impressions "when the ground is protected by ink," the inventor uses "the "decomposing influence of electricity or acid without any metallic "deposit."

5th head.—An electro-magnetic arrangement is used to secure the frame of an "automaton register" with accuracy. The automaton register consists of a strong table, to which a cast-iron frame is bolted. The surface to receive the design is secured to another frame above the first-mentioned frame and hinged to it. The surface that imparts the design is fastened to the cast-iron frame. When the top frame is closed upon the imparting or transmitting surface, certain marks are traced by which to detect inaccuracy in the working of the frame. "To further secure the "frame and greater accuracy in register," an electro-magnet is secured to the cast-iron frame; the circuit of the electro-magnet is only completed when certain metallic points in the top frame come exactly over other metallic points in the cast-iron frame. When the circuit is complete, the top frame is held down firmly, but not otherwise. This electro-magnetic arrangement is not mentioned in the Provisional Specification.

9th head.—The automaton register is used "for producing a "raised surface to be made into a printing block." Repeated coatings with transfer ink and size, and impressions therefrom, are taken "till the work is raised sufficiently;" it is then metallized and electrotyped. If a raised surface is made in hard drying ink, a lead matrix for electrotyping is obtained by pressure.

11th head.—"To produce a raised surface printing plate."—The transfer of the design is elevated by successive impressions (by means of the automaton register) which are treated with powdered resin. This elevated surface may be metallized and electrotyped. The contraction of an India-rubber or gutta percha medium to which the transfer is attached may also be used to raise the design on the printing plate.

12th head.—A reduced raised duplicate is obtained by the shrinking of an India-rubber matrix; this matrix is metallized and electrotyped.

24th head.—The "automaton register" is used to produce raised and sunken printing surfaces from a flat design, by successive sensitive coatings and reproductions. The raised design may be metallized and electrotyped.

[Printed, 4s. 2d. Drawings.]

A.D. 1861, November 12.—Nº 2834. (* *)

HAY, William John.—"Improvements in protecting iron and "wooden ships, caissons, dams, and other wooden or iron structures from decay and from fouling by vegetable and animal "matters, and in preparing the material employed therein."

First. "An improved method of treating the oxides of copper "and other metals" "when used for keeping ships' bottoms or "other structures from animalculæ and other animal and vegetable matters," and "also when used to preserve woods and "other materials." For which purposes protoxide of copper is ground in linseed oil and then boiled until it is reduced to the suboxide; a quick drying cupreous oil which suspends the oxide in the form of a paint or varnish is thereby formed. A small portion of silver or other metals and oxides is sometimes added. In cases where greater durability is required, an additional quantity of finely ground suboxide of copper is added, or when the paint is required to be black, the black oxide of copper. "The "paint or varnish may be thinned by spirits of turpentine "naphtha, or any other cheap spirits."

Second. "The use of zinc, either amalgamated or not, in contact "with the inside or outside of iron vessels, ships' iron casings, "and other structures, as a protection against electro-chemical "action arising from any imperfect application of the protective "varnish, paint, or other material, or from the accidental abrasion "of the said protective coatings or otherwise."

[Printed, 4d. No Drawings.]

A.D. 1862, May 10.—Nº 1405. (* *)

MOORE, Robert.—"Improvements in the structure and appliances of ships and other vessels."

The only part of the present invention relating to the subject of this work describes a "magnetic indicator." This instrument is employed "for steering or laying the vessel's course," or correcting "the radiated card or table commonly called the mariner's "compass." Besides the usual centre directing magnet of the card, "auxiliary magnets" are pivoted on the card, one on each side of the directing magnet; each "auxiliary magnet" has a graduated arc. "In the normal state of magnetism they will "stand parallel or nearly so with the directing magnet, and "under any abnormal magnetic influence will deviate from their "parallel direction towards the point of exceptional attraction "acting on the directing magnet. The graduated arcs will then "mark the angle of deviation and by that means the true and "magnetic north points may be ascertained by calculations peculiar to mariners." A tubular ring of aluminum, jointed "by "electro-galvanism," is used to give the card buoyancy "when "required to be employed in liquid;" glycerine is the fluid preferred.

[Printed, 8d. Drawing.]

A.D. 1862, May 15.—N° 1466. (* *)

JOUVIN, Jean Pierre.—"An improved process for preserving "iron plated and other vessels and metallic articles from oxidation and preventing ships' bottoms from fouling." "For preserving iron ships from oxydation by the action of sea water, "my process consists in lining the inner surface of ships' sides "and bottoms," "with sheets or lamina of zinc applied directly "against the sheet iron, and there held fast between the latter and "the frames. But as iron ships now afloat present some difficulty to the application of such zinc sheathing in the interior of "their holds, I first scour with care the internal sides of the hold, "and afterwards I apply thereon a double coat of a paint made "of powdered metallic zinc, which I spread all over from the keel "up to a little above the water line."

2. To protect the exterior part of the hull immersed, from the deposit of marine shells and plants, mix fifty-five parts of turbeth mineral, with forty-five parts of Prussian blue; then take of boiled linseed oil two hundred and fifty parts, of red lead or any other vehicle for the poisonous compound, six hundred and fifty to six hundred and sixty parts, and of the above-named compound, ninety to one hundred parts. Before this poisonous compound is

applied, every part of the iron to be immersed or wetted must be previously coated with two layers of the metallic zinc paint, after being scoured as completely as possible.

"This poisonous compound may prove also very advantageous "if applied to wood employed to secure dikes, embankments, and "for marine constructions to protect them from injury by teredos. "The smallest particle of the chlorocyanide of mercury and "sodium produced by its contact with sea salt suffices to kill "instantaneously animalculae, plants, and even their germs when "brought within its influence."

3. To apply the invention to iron-plated vessels, "I place either "between the woodwork of the hull and each iron plate a sheet "of zinc, the surface of which is rather smaller than that of the "iron plate; or I first coat this woodwork with a thick layer of "metallic zinc paint, then each iron plate previously well scoured "is similarly painted on its inner face, and adapted to the sides of "the ship."

4. "To preserve sheet iron tanks, marine boilers, steam engines, "and other similar articles from oxydation, I either apply on them, "that is to say, externally, zinc sheets, or I coat them with a "double layer of the afore-mentioned metallic zinc paint." "To preserve the parts of cables and chains stored in wells, "where they are oxydised very rapidly, I apply on each of the "rings or links a band of zinc fastened by screws. I apply the "metallic zinc paint to iron articles in general, wherever red lead "paint is now made use of and as a substitute therefor."

5. "For ships' bottoms with a copper sheathing, before the "sheathing is applied, I coat the woodwork over with a thick "layer of metallic zinc paint. But in the present case it is more "economical to employ powdered cast iron, or, in preference, iron "powder, instead of zinc powder, to prepare the metallic protect-"ing paint, as it will protect copper as effectually. Should it be "found, however, that copper sheathing gets foul with barnacles "and sea weeds it must be coated with the poisonous compound "before mentioned."

[Printed, 4d. No Drawings.]

A.D. 1862, July 15.—Nº 2035. (* *)

GHISLIN, Thomas Goulston.—"Improvements in the treat-"ment or preparation of British and foreign algæ, and the appli-

"cation of the same to various branches of the arts and manu-"factures." The seaweed "should be first steeped in dilute "sulphuric acid for about three hours," and be then dried so as to become hard, "after which it is to be ground up or reduced to "an almost impalpable powder." A strong glutinous solution is to be prepared by well mixing and boiling together ten per cent. of glue dissolved in water, five per cent. of gutta percha, and two and a half per cent. of India-rubber dissolved in naptha or other suitable solvent of these gums, and ten per cent. of coal tar. Five per cent. of sulphur, five per cent. of resin, two and a half per cent. of alum, and, say, sixty per cent. of the seaweed (all in a dry and pulverised state) are to be "carefully and intimately" mixed in the boiling compound, and "when the ingredients have been "well incorporated the mass must be submitted to heat in a "suitable oven, taking care that the mixture be not heated above "three hundred degrees Fahrenheit." The mass will then be brought into a plastic state, and may be moulded, embossed, pressed, stamped, or otherwise formed into any desired shape, "and thereby adapted, when it becomes hard, for various useful "or ornamental purposes." A cheaper article is produced by mixing fifteen per cent. of glue dissolved in water with fifteen per cent. of heated coal tar, and intimately incorporating there-with seventy per cent. of the pulverised seaweed; the compound is to be baked as above mentioned, the heat not exceeding three hundred degrees. "This substance, when cold and dry, will "become hard, and will form a good and cheap substitute for "ebony." A surface resembling ivory may be obtained by boil-ing the substance "in a solution composed of caustic lime and "water," and afterwards steeping it in dilute sulphurous acid for several hours or "even days;" it may then be "submitted to "chlorine gas or chloride of lime" until it becomes bleached, and it may be necessary to repeat the process more than once. If thin flat sheets with a surface resembling ivory be required, "they may also be produced from any of the tubular algæ or "seaweeds by splitting up the tubes and then cleaning and pre-"paring their surfaces so that they may be used for the intended "purpose when properly bleached."

The above process is referred to in the Specification of a subsequent invention, No. 1072, A.D. 1864 (*see page* 838.)

[Printed, 4*d*. No Drawings.]

A.D. 1862, September 29.—N° 2638. (* *)

GRIFFITHS, Robert.—"Improvements in the construction of "iron ships, and in the method of fastening metal sheathing "thereon to keep them from fouling." The improvements consist in having strips or bars of iron or other suitable metal secured with screws or rivets along the longitudinal joints of iron ships, having rabbets or recesses on each edge of them, so that strips of wood or other suitable material can be inserted, so as to caulk and secure the joints, and keep the water from coming in contact with the joints and rivets or passing through the joint in the skin of the ship. When the ship is built with one row of plates lapping over the other, or what is generally termed 'clinker built,' the strips or bars in that case will only require to have the rabbets or recesses on one edge, the recess on the other edge being formed by the bar being placed as much over the edge of the plate as will be required for the wood or other caulking material to be inserted. "When the iron ship is to be sheathed with metal "sheathing, I coat over those parts which are to be sheathed "with marine glue or other suitable adhesive material that is a "non-conductor of electricity, and also the metal sheathing, "which may be sponged over with an ordinary suitable solution, "such as is used for marine glue; or the sheets of sheathing "may be made hot (to make them and the non-conducting "materials stick together) just before the sheathing is put on it. "The sheathing is then nailed along its edges to the wood, or "the material that is in the rabbet or recesses of the iron strips "along the joints of the ship." Where it is not necessary to caulk the joints, "I put longitudinal narrow cleats of wood at "suitable distances, to which I nail the sheathing."

The sheathing metal which covers the longitudinal strips or bars, the bars not sheathed, and the nails or rivets employed to attach the sheathing metal to the sheets of bituminous material, may be of different metal or quality to the sheets of sheathing metal employed to cover the other surfaces of the iron ship or vessel, in order to cause galvanic action to take place between the two distinct metals thus combined, and giving to the sheathing metal cleansing properties caused by the wearing away of its surface.

[Printed, 10*d*. Drawing.]

A.D. 1863, March 25.—N° 776.

WHITE, JOHN.—(*Provisional Protection only.*) "Improvements "in protecting the surface of the iron and steel of ships and all "other structures, except that of cables, tanks, and boilers, while "in contact with water from decay, in preventing or abating, and "in facilitating the removal of foulness of ships' bottoms, and in "giving a capacity of increased speed to ships."

"For protecting the surface of the iron and steel of ships' "bottoms and other structures, except that of cables, tanks, and "boilers, while in contact with water from decay, I fix on the "surface of the iron or steel zinc or aluminium equal to area "of surface to at least one sixteenth part of the area of surface "of the iron or steel by means of iron or steel screws, rivets, or "nails, *taking care that some of the points of contact of the iron "or steel and of the zinc or aluminium respectively are clean when "they are fixed together, and that they are fixed in close contact*; "and for preventing or abating and for facilitating the removal "of foulness of ships' bottoms, and for giving a capacity of "increased speed to ships, I cover the surface of the ships' bottoms "while dry, by means of a plasterer's trowel or other implement, "with a composition made by melting and mixing together equal "parts of fat and oil, or about equal parts of fat, oil, and white-"lead, or one part of fat, two of oil, and three of powdered quick-"lime, and from time to time, when necessary, having scraped off "the foulness (if any) from the ships' bottoms, while dry or while "afloat, I cover the ship's bottom, while dry or while afloat, again "with any one of the said compositions, using for that purpose, "when necessary, a diving apparatus, and rubbing on the compo-"sition with the hand, and using a plasterer's trowel or other "implement for spreading it."

[In the first portion of this invention electro-chemistry is evidently applied to the protection of ships' bottoms.]

[Printed, 4*d*. No Drawings.]

A.D. 1863, June 8.—N° 1409. (* *)

HOLLINGSWORTH, ALFRED JAMES.—"A new or improved "spirit compass with screw lever."

1st. "Fixing the elastic diaphragm from the outside, and in "such a manner that the hydraulic pressure is under perfect "control." The "elastic diaphragm" "used to generate and

"sustain the hydraulic pressure in the bowl" is fixed from the outside by means of a "chamber" "which screws on to the bottom "part of the bowl and presses the diaphragm firmly into its seat, "and it is acted on when necessary" by means of a "vertical "screw" furnished with a "circular plate" "which presses "against a diaphragm." "The hydraulic apparatus is protected "from injury" by means of a "cap" "which screws on the "bottom part of the bowl over the chamber of the diaphragm." 2nd. "A double or compound needle." "The parts are so "arranged as to coincide when fixed with a diameter of the card, "as usual, and the eye in the centre is formed by means of a "semicular curve in each needle. It is fixed to the card at its "centre by means of steady pins passing through the flaps of a "brass tube in the circular portion of the needle under the cap." 3rd. A "contrivance for raising the card from off the centre pin and "for reseating same." This is accomplished "by means of an "apparatus at the side of the bowl" "consisting of a system of "levers" one of which "passes into the bowl through a small "aperture" "properly fitted with a disc of india-rubber or other "like material."

[Printed, 10d. Drawing.]

A.D. 1863, June 20.—N° 1550.

PETERSON, CHARLES.—"A new material or compound appli"cable to the manufacture of pipes or tubes, to caulking or "covering ships' bottoms, and to other useful purposes."

The Final Specification states that one of the purposes to which the said tubes may be applied is to contain telegraphic wires.

Vegetable fibre is boiled in a solution of caustic alkali, and then "rendered into a pulp by any convenient means;" a certain proportion of hot saponified tar is mixed with the pulped fibre and alum or sulphuric acid is added to the mixture. "I then "take the mixture or substance so produced, and form it by any "convenient method into sheets, slabs, pipes, tubes, blocks, or "other shape suitable for any of the purposes before mentioned."

"When this composition is to be used for finer or superior "purposes, I admix with it a proportion of flour or other fari"naceous matter, the same having been first made into a strong "paste by boiling, and then intimately mixed with the vegetable "pulp."

"The application of pressure in combination with heat is "necessary to the manufacture of any and all the articles herein-"before mentioned, after which it will become perfectly hard. "The admixture of the flour or other farinaceous matter renders "the material less harsh and more plastic, and it is then suitable "for fine work, such as picture frames, cornices, &c. This "material or compound will withstand the extremes of temper-"ature in all climates."

[Printed, 4d. No Drawings.]

A.D. 1863, July 1.—N° 1635.

SNELL, William (*a communication from Jules Wiese*).—(*Provisional Protection only.*) "An improved waterproof material."

"This invention consists of the fabrication of a material or "substance called elastic fibrine (or 'gounne indéchirable'" [gomme indéchirable?]), "composed of gutta perchà, new or "waste caoutchouc, or any other kind of elastic gummy matter "mixed with hair, wool, fur, flax, hemp, cotton, or other fibrous "matter impervious to moisture, in various proportions, and to "be moulded or fashioned into various forms, and applied to "divers uses, such as covering of floors in place of kamptulicon "or other similar fabrics, *for submerged telegraphic cables*, in the "manufacture of boots and shoes, and for many other purposes "in which resistance to moisture and changes of temperature, "elasticity, durability, cheapness, and facility of renovation are "considerations."

[Printed, 4d. No Drawings.]

A.D. 1863, July 13.—N° 1751.

JODOCIUS, Pierre Charles Alexandre (*a communication from John d'Atouquia de Franca-Netto*).—"Improvements "in fishing, and in the apparatus or means to be employed "therein."

"The said invention consists in the application and use of the "attractive or luring power of an illuminative body on fish of "every species, in order to surround or bring the same into an "apparatus, cage, net, or other device so constructed that the "fish having once entered therein, their escape will be rendered "impossible. The illuminative agent which I prefer to employ "is the ordinary electric light, or the same in vacuo, but any

"other sufficiently powerful light may be used. The rays of "light are transmitted through white or colored glass or crystal, "the different colors to be chosen according to the phosphoric "state of the water or its color, or the kind of fishing to be "undertaken. The apparatus, cages, or nets which I have found "to answer the best are of different sizes, shapes, and construc-"tion;" "their size and construction depends on the tonnage "of the fisher boat, and also on the quantity and species of fish "to be caught."

In the case of a small boat, a buoy in connection with a net and electric light is used; with larger boats a net, open at the bottom and with the electric light in the upper part of the net, is employed. For fishing boats of still larger tonnage, an apparatus with funnel-shaped openings is set forth. In large fisheries a cage with feed pumps, &c., to raise and lower the apparatus is described; the large apparatus may be fitted with "air and water-"tight compartments" and they may be made to take in ballast.

[Printed, 1s. 6d. Drawings.]

A.D. 1863, July 16.—N° 1792.

MAW, EDWIN.—(*Provisional Protection only.*) "Improvements "in the manufacture of pillars, posts, columns, mouldings, and "buildings when corrugated metal is employed, and in machinery "used in corrugating, moulding, and shaping metal for such "purposes."

"Each pillar, post, or column is made of a square section, with "the angles rounded off, and each of the sides is *hollow* or "concave, so that the exterior of a post, pillar, or *column* will "consist longitudinally of four convex and four hollow or con-"cave surfaces." The plates are corrugated longitudinally and they overlap longitudinally. When the said posts "are to be "used as *telegraph posts*, lamp posts, and for other uses," "I use "therewith in each case a base plate flanged all round with an "opening in the centre, or a boss to receive the lower end of the "pillar, post, or column." To support the said posts, in some cases, "a metal frame with panels of corrugated metal" is used. "In some cases I employ on such base plate or frame "triangular webs or buttresses of corrugated metal rising ver-"tically from the base plate up the pillar;" and in some cases the end of the post which enters the earth is surrounded with a

metal frame which is fixed to the base plate or to the pillar; into the said frame panels of corrugated metal are introduced. "More " or less of the frame is to be below the surface of the earth " when fixed, and the space between the interior of the frame " and the column, pillar, or post is to be filled in with earth or " concrete.

The above mentioned machinery consists of a pair of corrugating dies placed upon a moveable horizontal table or bed. When the table is moved, a roller acting on an incline presses the dies more and more together; the plate, being between the dies, is corrugated.

[Printed, *4d*. No Drawings.]

A.D. 1863, July 23.—N° 1843.

SOUL, MATTHEW AUGUSTUS (*a communication from John Palmer*).—" Improvements in expelling solid and liquid refuse " matter from steam and sailing ships below the water line, " applicable also for discharging cannon below water from ships " and forts, and in part for charging gas retorts and iron furnaces, " and for other similar useful purposes."

The principle which constitutes this invention consists in depositing the material to be disposed of under unequal pressure of water, air, or other agent into a receptacle which, by means of certain mechanism, "can be put alternately into operation by " means of the aforesaid unequal pressures."

1st. " Getting rid of the ashes, clinkers, and other refuse of " the furnaces of a steam ship without the necessity of hoisting " them out of the stoke hole."

2nd. " The application of the aforesaid submarine receptacle or " apparatus to the discharging of the contents of sinks and water-" closets when such sinks and waterclosets are fixed below the " water level in any part of the ship."

3rd. The adaptation of similar apparatus to the firing of ordnance below the water level. The Final Specification states that the gun can " be fired *by means of an electric battery* or other " contrivance."

4th. The adaptation of the aforesaid invention to the firing of ordnance in a submarine fort. The piece is to be fired by some one on shore having " having at his command *a galvanic battery* " in connection with the guns of the fort in order that he may

"see the object to be fired at in passing the fort, which could not "be done from the interior."

5th. The application of the said invention "to the charging of "gas retorts and iron furnaces on land."

[Printed, 1s. Drawing.]

A.D. 1863, November 17.—N° 2880.

BETTELEY, JOSEPH.—"Improvements in sheathing ships and "other vessels."

In the Provisional Specification the inventor states:—"I em-"ploy sheets of copper, or an alloy of copper coated at the back "with zinc, or an alloy of zinc or other alloy which is readily "fusible *and electrically positive to copper*. I produce such "sheets by casting on to a thick plate of copper or alloy of "copper the zinc or readily fusible alloy, and I roll out the com-"pound slab so produced into sheets of the thickness required, "or a compound slab suitable to be so extended may be other-"wise produced; or thin sheets of copper or alloy of copper may "be coated on one side with zinc or readily fusible alloy by a "process similar to that of galvanizing iron or otherwise." Sheets of copper coated with japan, vitreous composition, or fibrous material are also used to prevent "the injurious action" which ordinary sheathing has on iron fastenings. "In applying the "sheathing so coated at the back with fusible alloy the plates are "not lapped, or otherwise *injurious galvanic action might ensue*, "but the plates are butted together, and a strip of zinc or other "metal or alloy applied at the back under the joint. The nails "employed for securing the sheathing should be japanned."

The Final Specification makes no direct allusion to the electric character of the cause of the destruction of iron vessels when sheathed with copper, but states that the preferable method of producing the above-mentioned compound plates is to first obtain a thin coating of tin upon them and then a coating of zinc or alloy.

[Printed, 4d. No Drawings.]

A.D. 1864, April 28.—N° 1072. (* *)

GHISLIN, THOMAS GOULSTON.—"Improvements in the treat-ment and application of seaweed." Any of the common kinds of seaweed are employed, and, after being treated in the manner

described in Specification, No. 2035, A.D. 1862, are dried and reduced to an impalpable powder, or, if operated upon when wet, are made into a paste. The powder or paste is incorporated with the following ingredients or some of them, and in proportions according to the articles to be manufactured; gums, gum resins, including India-rubber, gutta percha, and substances of that class, resins natural or artificial, bituminous substances and the products of the same, paraffin and oily or fatty substances, fibrous materials, the silicates of potash and soda, pulverised chalk, talc, and other earthy matters, metallic oxides, gelatine, farina, alum, tungstic acid, powdered charcoal, and other analogous substances. The particular ingredients and the proportions preferred are mentioned according as tenacity, elasticity, solidity, or durability is required. The mass is mixed and incorporated in a masticator provided with rollers or other mechanism, and then passed between cylinders. Amongst the various purposes enumerated for which this "algæite" is available are "insulators for telegraphic pur- "poses" and "boxes for sea and other compasses." The compound may be hardened and rendered impermeable to water "by "steeping it in boiled oil, or in any drying oil, or in a solution of "gum or resin, or in any kind of varnish."

[Printed, 4d. No Drawings.]

A.D. 1864, May 26.—N° 1310.

BROWN, John Harcourt. — "Improvements in treating "animal substances for the manufacture of size, pulp, and pulpy "matter, and converting the said pulp or pulpy matter into "sheets, slabs, blocks, thread, hollow or tubular articles, and "such other articles of commerce, for which the said sheets, slabs, "blocks, threads, hollow or tubular articles may be applicable."

Amongst other uses to which the said animal substances are applied, "the insulation of electric and magnetic conductors or "wires" is mentioned. For the production of these insulated conductors, the inventor prefers to employ "the refuse of animal "hides known as scrolls or glue pieces, and also the cuttings of "calf and sheep skins, or the hides or parts of hides of any "other animals." The substance chosen is soaked in water, submitted to the action of alkalies, crushed by machinery, and submitted to the action of a lukewarm bath, containing one part of sulphuric acid and 100 parts by measure of water. After remaining

until they assume "a jelly-like appearance," the acidulated liquor is drained off from the crushed pieces of the said substance, and the said crushed pieces are submitted to a bleaching liquor "until "the fibrous effects are produced." "The fibre must be mixed "with india-rubber, gutta percha, ballata, or any other suitable "plastic materials impervious to water, and rolled into tubes, or "otherwise wound round the wires, or attached by any other "suitable means, either in a plastic or semi-plastic state; or it "may be formed into tubes, cases, and other hollow configurated "articles, when the pulp is beat up suitable as for paper making "by the vacuum principle," as described in a former Patent granted unto the inventor, "upon perforated metallic moulds covered "with felt, and submerged in the fibrous animal pulp, or in pulp "composed of a combination of fibres and other materials."

[Printed, 6*d*. No Drawings.]

A.D. 1864, June 9.—N° 1436.

HENRY, MICHAEL (*a communication from Henry Giraud*).—"Improvements in gas regulators, also in gauges and clocks."

In a gas regulator, "the gas is supplied to the burner in excess "of combustion," and "is the agent of its own regulation." The regulating gas is "returned to the holder by a return pipe having "no outlet save at the ends, so that this return gas signalizes the "state of pressure."

"In an arrangement in which electricity is used the return pipe "leads under a float held in a cylinder, and suspended from a "wheel carrying two needles moved at the ends of a horizontal "diameter by the float; as the pressure varies they communicate "with an electric wire, and as the wheel turns exert friction "against a dial formed of two semicircles at each side of the "diameter. When the pressure is in equilibrio the needles are "brought against contact breakers, but when the pressure varies "they send a current to the semicircles, which are in electric communication, by line wire and earth wire, with clockwork moved "by a weight, and raising and depressing the spindle of a supply "valve. When contact is broken the wheelwork is held by a "stop, which when the pressure alters is removed by electro-"magnets, the valve spindle is put into gear, and the valve opens "till equalization of pressure again breaks contact. The needles "may transmit the current to bells or alarms."

A gauge is described and shown, also a clock is set forth in which a gas meter is caused to work the hands.

[Printed, 8*d.* Drawing.]

A.D. 1864, June 15.—N° 1486. (* *)

WHITESIDE, ROBERT.—" Improvements in preserving iron " ships and ships' sheathing from corrosion and fouling, and in " apparatus to be employed therefor."

" I insulate the zinc from the copper, and provide wires or con- " ductors to connect the two; these are led into the ship, or so " arranged that they may be separated and coupled up at will; " when they are coupled the sheathing is protected from corrosion, " and should any fouling be found to accumulate it is readily " cleared off by uncoupling the zinc from the sheathing. I " enclose the zinc in a non-conducting case, say, of gutta percha, " which case is firmly fixed to the copper, and air tight every- " where except at the lower end. The sea water is suffered to " enter the case and envelope the zinc, and the wires are coupled " when corrosion of the copper sheathing is to be arrested; at " other times the sea water may be ejected from the case by " forcing in air, suitable pipes and air pumps being provided. " In place of zinc another metal positive to copper may be " employed, and similarly sheathing of compounds of copper or " of metal other than copper may be protected and preserved free " from fouling by the employment in the manner above-described " of a metal negative to it.

" In order to protect iron ships I employ in a similar manner " two metals, the one negative and the other positive to iron, " and connect them alternately to the shell or skin of the vessel."

[Printed, 4*d.* No Drawings.]

A.D. 1865, May 2.—N° 1230.

SIEMENS, CHARLES WILLIAM.—" Improvements in the means " and apparatus for regulating the power and velocity of machinery " or apparatus in motion."

This invention consists of a " liquid pendulum " for the above-mentioned purposes. A cup dips into a liquid and rotates on its vertical axis; the liquid rises in the cup and is maintained at the overflowing point. When any further amount of power is applied to the apparatus it is absorbed (by the increased overflow) and the speed thereby kept at the normal standard. This arrangement may either be employed to act on the throttle valve of a

steam engine, or as a fly or pendulum to ordinary clockwork, or in analogous ways to these upon other motive power machinery; amongst other applications, the Final Specification sets forth the details of this invention when used to an electric clock, to a "Morse" printing telegraph apparatus, and to a synchronous chemical printing telegraph apparatus.

In an electric clock fitted with this apparatus, the absorption of power which takes place upon acceleration of speed is made to do the duty of a fly. The motive power (merely an example of various modifications that may be used) is a fixed electro-magnet; electrical currents are passed at proper intervals through its coils, and thereby cause the rotation of an iron bar fixed on to the vertical spindle that carries the liquid pendulum. When an increased impulse is given to the spindle, the cup is prevented from following it, and by turning on a screwed part of the axle, is screwed downwards, thus entering more into the liquid, and through the intervention of a spring, retarding the motion of the spindle. "As soon as the retarding influence ceases, the increased "tension which has been put upon the spring" "will cause it to "draw the cup into its original position relative to the spindle." The said spindle is adjustable, and is connected, through wheelwork, with the hands of a clock.

In applying this invention to the regulating of the motion of a "Morse" printing telegraph apparatus, the mainspring barrel, which imparts motion to the telegraph apparatus, is connected by speed-increasing wheelwork with the spindle of the regulating apparatus, and the speed of the instrument is thus controlled in a similar manner to that described above for the electric clock. The gradually diminishing power of the spring in unwinding is also compensated for; for this purpose, the regulator "is so "arranged that the power of the spring when freshly wound up "is considerably more than sufficient to maintain the fluid in the "cup at the point of overflow, while, when nearly unwound, it is "just sufficient to keep the liquid at that point."

In a chemical printing telegraph apparatus, in which a receiving cylinder is made to revolve synchronously with a transmitting cylinder, a worm wheel on the travelling spindle imparts a rapid rotary motion to the vertical spindle of the regulating apparatus. Increase in the driving power is absorbed by the overflow.

[Printed, 1s. 6d. Drawings.]

INDEX OF SUBJECT MATTER.

[The numbers refer to the page on which the paragraph containing the subject commences. The names printed in *Italic* are those of the persons by whom the inventions have been communicated to the applicants for Letters Patent.]

ERRATA.

Page 16, line 1 from top, *for* "February 18" *read* "February 19."

Page 140, line 10 from top, *for* "Ernest" *read* "Ernst."

Page 313, line 17 from top, *for* "Kerr" *read* "Ker."

Page 406, line 3 from top, *for* "Cardock" *read* "Cradock."

Page 591, line 3 from bottom, *for* "Chaub" *read* "Schaub."

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——— (*Working Men's Club, Brixton Hill*).
——— (*Working Men's Club, St. Mark's, Victoria Docks*).
——— (*Working Men's Club and Institute Union, Strand*).
——— (*Working Men's Club and Institute, Battersea*).
——— (*Working Men's College, Great Ormond Street*).
Loughborough (*Working Men's Club and Institute*).
Madeley (*Anstice Memorial, Workmen's Club and Institute*).
Manchester (*Athenæum*).
——— (*Law Library*).
——— (*Mechanics' Institution*).
——— (*Natural History Museum, Peter Street*).
——— (*Portico Library, Mosley Street*).
——— (*Royal Exchange Library*).
Mansfield (*Co-operative Industrial Society*).
——— (*Mechanics', Artizans', and Apprentices' Library*).
Merthyr-Tydfil (*South Wales Institute of Engineers*).
Middlesborough (*Mechanics' Institution*).
Modbury (*Mechanics' Institution*).
Mossley (*Mechanics' Institute*).
Newark (*Mechanics' Institute*).
Newcastle-upon-Tyne (*Mechanics' Institution*).
Newcastle-upon-Tyne (*Working Men's Club*).
New Mills, near Stockport (*Mechanics' Institute*).

Newport, Isle of Wight (*Young Men's Society and Reading Room*).
Northampton (*Mechanics' Institute*).
Nottingham (*Free Library*).
——— (*Mechanics' Institution*).
——— (*Subscription Library, Bromley House*).
Oldham (*Analytic Literary Institution*).
——— (*Mechanics' Institution, Werneth*).
Ormskirk (*Public Library*).
Oswestry (*Institute*).
Patricroft (*Mechanics' Institution*).
Pembroke Dock (*Mechanics' Institute*).
Pendleton (*Mechanics' Institution*).
Penryn (*Working Men's Club and Reading Room*).
Perth (*Mechanics' Library, High Street*).
Peterborough (*Mechanics' Institution*).
Plymouth (*Working Men's Institute*).
Poole (*Literary and Scientific Institution*)
——— (*Mechanics' Institute*).
Portsea (*Athenæum and Mechanics' Institution*).
Preston (*Avenham Institution*).
——— (*Society of Useful Knowledge*).
Rawtenstall (*Mechanics' Institution*).
Richmond (*Working Men's College*).
Rotherham (*Rotherham and Masbro' Literary and Mechanics' Institute*).
Royston (*Institute*).
Ryde, Isle of Wight (*Philosophical and Scientific Society*).
Saffron Walden (*Literary and Scientific Institution*).
St. Just (*Institution*).
St. Leonard's (*Mechanics' Institution*).
Salford (*Working Men's Club*).
Saltaire (*Literary Institute*).
Selby (*Mechanics' Institute*).
Sheffield (*Branch Free Library*).
——— (*Literary and Philosophical Society, School of Arts*).
Skipton, Yorkshire (*Mechanics' Institute*).
Southampton (*Hartley Institution*).
——— (*Polytechnic Institution*).
Southport (*Athenæum*).
South Shields (*Working Men's Institute and Club*).
Spalding (*Mechanics' Institute*).
——— (*Christian Young Men's Association*).
Staines (*Literary and Scientific Institution*).
Staines (*Mechanics' Institute and Reading Room*).
Stamford (*Institution*).
Stourbridge (*Church of England Association*).
——— (*Iron Works Reading Room and Library*).
——— (*Mechanics' Institution*).
——— *Working Men's Institute*).
Stratford (*Working Men's Hall*).
Sunderland (*Working Men's Club*).
Swansea (*Royal Institution of South Wales*).
——— (*Working Man's Institute*).
Tavistock (*Mechanics' Institute*).
——— (*Public Library*).
Thornton, near Bradford (*Mechanics' Institute*).
Thornton Heath, Croydon (*Workmen's Club*).
Todmorden (*Mechanics' Institution*).
Truro (*Cornwall County Library*).
——— (*Institution*).
——— (*Royal Institution of Cornwall*).
Tunbridge Wells (*Mechanics' Institution*).
——— (*Society of Literature and Science*).
Turton near Bolton (*Chapel Town Institute*).
Twickenham (*Economic Museum*).
Ulverston (*Temperance Hall*).
Uttoxeter (*Mechanics' Literary Institute*).
Wakefield (*Mechanics' Institute*).
Watford (*Literary Institute*).
Wells, Somerset (*Mechanics' Institution, Grove Lane*).
——— (*Young Men's Society*).
Whaleybridge (*Mechanics' Institute*).
Whitby (*Institute*).
——— (*Museum*).
——— (*Subscription Library*).
Whitehaven (*Mechanics' Institute*).
——— (*Working Men's Reading Room*).
Whitstable (*Institute*).
Wisbeach (*Mechanics' Institute*).
Wolverhampton (*Library*).
Wolverton (*Institute*).
Woodbridge (*Literary and Mechanics Institute*).
——— (*Working Men's Hall*).
Worcester (*Railway Literary Institute*).
——— (*Workman's Hall*).
Workington (*Mechanics' Institution*).
York (*Church Institute*).
——— (*Institute of Popular Science, &c.*)
——— (*Railway Library*).

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——— („ „ *Lincoln's Inn*).
——— („ „ *Middle Temple*).
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——— (*Institution of Civil Engineers*).
——— (*Odontological Society*).
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——— (*United Service Museum*).
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——— (*Mechanics' Institution, David Street*).
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